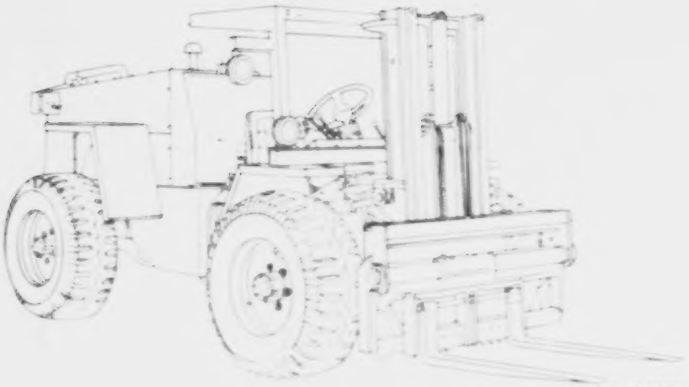
10-3930-638-24+P/989

TM 10-3930-638-24&P

TECHNICAL MANUAL
ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)



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ALPHABETICAL INDEX INDEX 1

TRUCK, FORKLIFT, DED,
PNEUMATIC TIRE, ARTICULATED
FRAME STEER, 4,000 LB. CAPACITY
ROUGH TERRAIN, ARMY MODEL MHE 237
(J. I. CASE MODEL M4K)
(NSN 3930-01-076-4237)

This copy is a reprint which includes current pages from Changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY
October 1980

READEX FICHE

best copy available

D101.11:

WARNING

FIRE HAZARD

Diesel fuel and combustible materials are used in operation and maintenance of this equipment. Do not smoke or allow open flames or sparks into areas where diesel fuel and combustible materials are used or stored.

DEATH

or severe injury may result if personnel fail to observe this precaution. If you are burned, seek medical aid immediately.

WARNING

OIL UNDER PRESSURE

2500 PSI PRESSURE

is used to operate this equipment. NEVER disconnect any hydraulic lines or fittings without checking manual to see how to drop the pressure to zero. Failure to follow this procedure could cause SEVERE INJURY. Should you be struck by a high pressure oil stream, seek medical help immediately.

WARNING

ELECTRICAL SHOCK HAZARD

Always disconnect battery ground cable before working on electrical components of this equipment.

DEATH

or severe injury may result if you fail to observe this precaution. If you receive an electrical shock, seek medical help immediately.

WARNING

FALLING EQUIPMENT HAZARD

Never crawl under equipment when performing maintenance unless equipment is blocked securely. Keep clear of equipment when it is raised or lowered. Do not allow heavy components to swing while suspended by lifting device. Exercise extreme caution when working near a cable or chain under tension.

DEATH

or severe injury may result if personnel fail to observe this safety precaution. If you are hurt by a falling object or chain or cable under tension, seek medical aid.

WARNING

TIRE INFLATION

Observe caution when inflating tires. Be sure tires are properly seated on rims before inflating.

DEATH

or serious injury may result if you do not observe this precaution. Improperly seated tires can burst with explosive force sufficient to cause death.

WARNING

TIRE DEFLATION

Deflate tire completely before removing wheel from rim. Refer to the manual to completely deflate tire. Failure to follow this procedure could cause SERIOUS INJURY. Should you be injured by not completely deflating the tire, seek medical help immediately.

WARNING

HIGH VELOCITY AIR

Compressed air, used for cleaning purposes, will not exceed 30 psi. Safety glasses must be used when cleaning parts with compressed air. Failure to do so could cause SERIOUS INJURY to your EYES and possible BLINDNESS. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

*TM 10-3930-638-24&P
C3

Changes in Force: 1, 2, 3

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *11 March 1988*

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)

TRUCK, FORKLIFT, DED, PNEUMATIC TIRE, ARTICULATED FRAME STEER, 4,000 LB. CAPACITY ROUGH TERRAIN, ARMY MODEL MHE 237 (J.I. CASE MODEL M4K) (NSN 3930-01-076-4237)

TM 10-3930-638-24&P, 1 October 1980, with change 1, 25 June 1982, and change 2, 21 February 1986, is changed as follows:

1. Change to narrative material is indicated by a vertical bar in the outside margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.
2. Remove old pages and insert new pages as indicated below.
3. File this change sheet in front of the publication for reference purposes.

Remove Pages	Insert Pages
2-3 and 2-4	2-3 and 2-4
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68-1 and 69-1	68-1 and 69-1
Kits-5 and 6	Kits-5 and 6

*This change supersedes TM 10-3930-638-24&P, IO1, 28 Feb 1987.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25F, Unit, Direct Support and General Support Maintenance Manual Requirements for: Forklift, 4,000 lb. capacity, Rough Terrain, Pneumatic Tire, Articulated Frame Steer (Model MHE 237).

Changes in Force: 1, 2

TM 10-3930-638-24&P
C 2
HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *21 February 1986*

CHANGE

NO. 2

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)

TRUCK, FORKLIFT, DED, PNEUMATIC TIRE, ARTICULATED FRAME STEER, 4,000 LB. CAPACITY ROUGH TERRAIN, ARMY MODEL MHE 237 (J.I. CASE MODEL M4K) (NSN 3930-01-076-4237)

TM 10-3930-638-24&P, 1 October 1980, with change 1, 25 June 1982, is changed as follows:

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3. File this change sheet in front of the publication for reference purposes.

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(C-vii blank) C-viii thru C283/287	C-1 thru 1-75
D-1 and D-2	D-1 and D-2

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-34B requirements for Storage Facilities-Storage Depots and Ammunition and Explosive Standards; DA Form 12-38, Organizational Maintenance requirements for Truck, Tractor, Diesel, Yard Type, 4x2, M878; Truck, Tractor, Line Haul, 6x4, 50,000 GVWR, M915A1 and Truck, Tractor, 10-Ton, 8x8, M1001, M1002, M1013, M1014 and DA Form 12-39, Organizational Maintenance requirements for Semitrailer, Refrigerator, KECO Model F9000RG; Semitrailer, Refrigerator, 7½-Ton, Models RGP-9000, RGP-9000 MOD, RGEP-9000; Semitrailer, Refrigerator, 7½-Ton, LEAR-SIEGLER Model 1348 and Semitrailer, Stake, 12-Ton, 4-Wheel, M127, M127A1, M127A1C; Semitrailer, Van, Cargo, 12-Ton, 4-Wheel, M128A1, M128A1C, M128A2C; and Semitrailer, Van, Supply, M129A1, M129A1C, M129A2C. (3 copies per account)

TM 10-3930-638-24&P
C 1

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 25 June 1982

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS) TRUCK, FORKLIFT, DED, PNEUMATIC TIRE, ARTICULATED FRAME STEER, 4,000 LB. CAPACITY ROUGH TERRAIN, ARMY MODEL MHE 237 (J.I. CASE MODEL M4K) (NSN 3930-01-076-4237)

TM 10-3930-638-24&P, 1 October 1980, is changed as follows:

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Remove pages	Insert pages
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
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By Order of the Secretary of the Army:

E.C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Organizational Maintenance Requirements for Truck, Forklift, Rough Terrain.

WARNING

JACKING VEHICLE

Make sure that vehicle will not roll or shift and that shipping lock pin is installed when jacking as instructed in this manual. Secure with chock blocks.

DEATH

or serious injury may result by your failure to follow this procedure due to vehicle turning and slipping off jack or jack stands. If injured, obtain medical aid immediately.

WARNING

TOXIC/FLAMMABLE

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause SERIOUS INJURY. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash with water immediately, and obtain medical aid immediately.

WARNING

EXHAUST GASES CAN BE DEADLY

Exhaust gases can produce symptoms of headache, dizziness, loss of muscular control, or coma. Permanent brain damage or death can result from severe exposure. You can insure your safety by following these rules:

- DON'T operate the heater or engine in an enclosed area unless it is properly ventilated.
- DON'T drive with any of the truck's inspection plates, cover plates, or the hood off unless necessary for maintenance.

If you notice exhaust odors or exposure symptoms, IMMEDIATELY VENTILATE the area. If the symptoms persist, remove the affected people and treat them:

- Expose them to fresh air.
- If necessary, give artificial respiration.
- Keep them warm.
- DON'T permit physical exercise.

Refer to FM 21-11, First Aid for Soldiers, for first aid treatment of injured personnel.

WARNING

NOISE HAZARD

Excessive noise levels are present any time the equipment is in operation. Wear hearing protection while operating or when working around equipment while it is running. Failure to do so could result in damage to your ears such as high frequency hearing loss. Seek medical aid should you suspect a hearing problem.

WARNING

STEAM UNDER PRESSURE

Remove radiator cap slowly to relieve pressure before completely removing when engine is hot. Failure to follow this procedure could cause SEVERE INJURY. Should you be scalded by steam, seek medical aid immediately.

WARNING

RETAINING RINGS UNDER SPRING TENSION

Exercise care when removing snap rings/retaining rings. Some of these parts under spring tension. SEVERE INJURY may result by the part striking your eye if you don't observe this precaution. If your eye is struck by a foreign object, seek medical aid immediately.

WARNING

Be sure that steering bypass valve is closed (fully clockwise) and that shipping lock pin is removed before operating vehicle.
DEATH
or severe injury may result due to loss of steering control if you don't follow this precaution.

WARNING

Keep hands and feet clear of steering cylinder assembly while checking for hydraulic leakage when engine is running. SEVERE INJURY may result by your failure to follow this procedure. If you are injured, obtain medical aid immediately.

WARNING

When bleeding air from lift cylinder assembly, don't look directly down at bleed fitting. Hydraulic oil is under pressure. SEVERE INJURY may result by your failure to follow this precaution. If you are injured, seek medical attention immediately.

WARNING

When welding hydraulic reservoir, partially fill it with water.
DEATH
or severe injury may result if you fail to observe this safety precaution. If you are burned, seek medical aid.

WARNING

If both tilt cylinders are to be removed from mast assembly, support mast assembly using a chain hoist.
DEATH
or severe injury may result by your failure to follow this procedure due to mast assembly falling forward, striking personnel standing/working in front of unit. If you are injured by falling equipment, obtain medical aid.

WARNING

Some procedures in this manual require that parts be heated prior to reassembly. Wear insulated gloves or use tongs when handling parts that have been heated. SEVERE BURNS may result if you fail to follow this precaution. If you burn your hands, seek medical aid.

WARNING

Exercise care when using alkali cleaners to avoid coming in contact with cleaner or breathing vapors. Wear a rubber apron to prevent clothes from coming in contact with cleaner and use cleaner in a well ventilated area. Failure to follow this precaution may cause SEVERE INJURY and/or skin rashes. If alkali cleaner is splashed on clothes or skin, flood area with large amounts of water and seek medical attention.

WARNING

Blue Vitriol solution, used to check cylinder sleeves, contains acid. Wear safety glasses to protect eyes from accidental splashing and avoid splashing solution on your skin. Failure to do so could cause SEVERE BURNS to your eyes and skin. If solution is splashed in your eyes or on your skin, wash off immediately and seek medical aid.

WARNING

When testing fuel injectors, always direct fuel injector tip away from you. Fuel from spray orifices can penetrate clothing and skin. Failure to do so could cause SERIOUS INFECTION. Be sure fuel injector tip is enclosed in a receptacle to contain spray. If skin is broken by fuel injector spray, seek medical aid.

TECHNICAL MANUAL
No. 10-3930-638-24&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 1 October 1980

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)

TRUCK, FORKLIFT, DED, PNEUMATIC TIRE, ARTICULATED FRAME STEER, 4,000-LB CAPACITY, TOUGH TERRAIN, ARMY MODEL MHE 237 (NSN 3930-01-076-4237)

Current as of 1 October 1980

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

This manual is designed to help you maintain the MHE 237 forklift truck. It's divided into chapters, sections and appendices. The chapters contain organizational, direct support, and general support maintenance procedures. The chapters are divided into sections containing maintenance procedures for the various systems which comprise the forklift truck.

The appendices contain supplemental information which you require to maintain the MHE 237 forklift truck. Included in the appendices is the repair parts and special tools list (Appendix C) which contains exploded view illustrations keyed to a parts listing.

To use the repair parts and special tools list:

1. Refer to the repair parts and special tools list table of contents located in appendix C to determine the functional group within which the repair part you are trying to locate belongs. This is necessary since illustrations are prepared for functional groups and part listings are divided into the same groups.

2. Find the illustration covering the functional group to which the repair part belongs.

3. Identify the repair part on the illustration and note the figure and item number of the repair part.

4. Using the repair parts listing, find the figure and item number noted on the illustration to determine the SMR code, National Stock Number, Part Number and FSCM.

The maintenance procedures contained in this manual tell you several things:

what tools you need to do the job
materials or parts required
what condition the vehicle is to be in before work is started

In addition to the text, you'll have either an assembled view or an exploded view illustration of the associated parts. Sometimes, the illustration will be keyed by an arrow to an overall view of the vehicle to help you determine the approximate location of the parts. The illustration is keyed to the text by numbers and shows you how to take the part off and put it on. The following problem will show some of the features of this manual.

PROBLEM

An operator brings his MHE 237 forklift truck into the shop with an engine problem. The engine stalls frequently or doesn't develop full power. The best way to solve his problem is by using your manual. This is what you do:

1. How do you start?
   Look at the cover of the manual.
      On the cover you'll find a listing for TROUBLESHOOTING INDEX. It tells you to go to page 2-7. To find page 2-7 fast, open the manual by using the black tab that lines up with the listing on the cover.

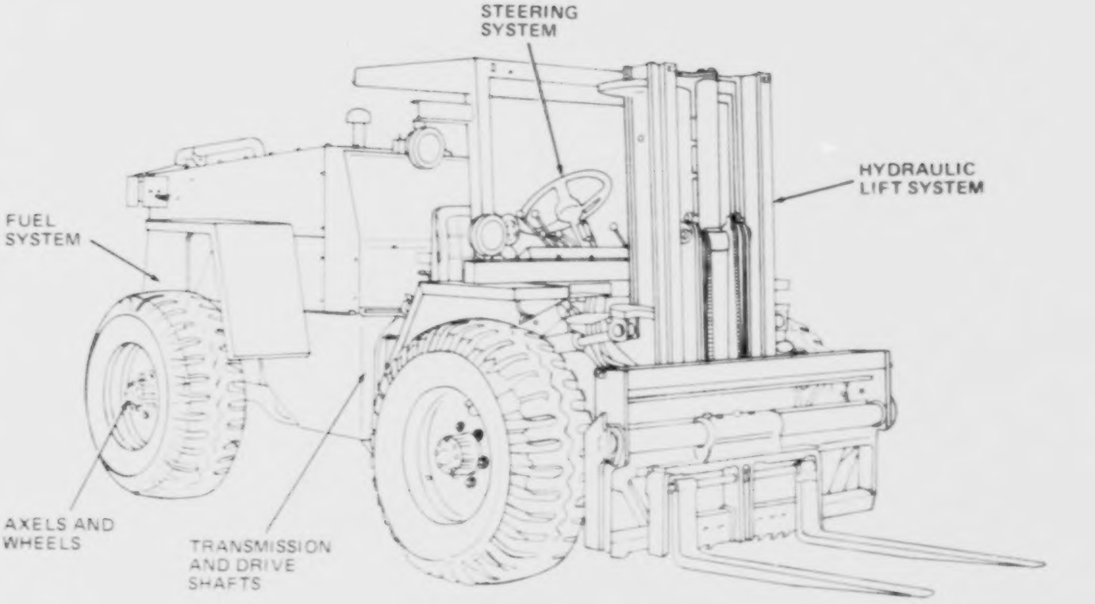
2. What kind of problem do you have?
   Find it in the symptom index.
      The symptom index is a list of problems covered by the section. It tells you that your problem, "engine stalls frequently or doesn't develop full power" is covered in paragraph 2-9, MALFUNCTION entry number 5.

3. How do you determine what is causing the problem?
   Go to paragraph 2-9, MALFUNCTION entry number 5.
      There you'll find the troubleshooting procedures you'll need. The procedure has columns with the headings: MALFUNCTION, TEST OR INSPECTION, and CORRECTIVE ACTION. Starting at step 1, read the procedure. Each step tells you what to do and what to look for. Follow the steps, in order, until you find your problem. When you find the problem, the CORRECTIVE ACTION column will tell you how to fix it.

HOW TO USE THIS MANUAL (cont)

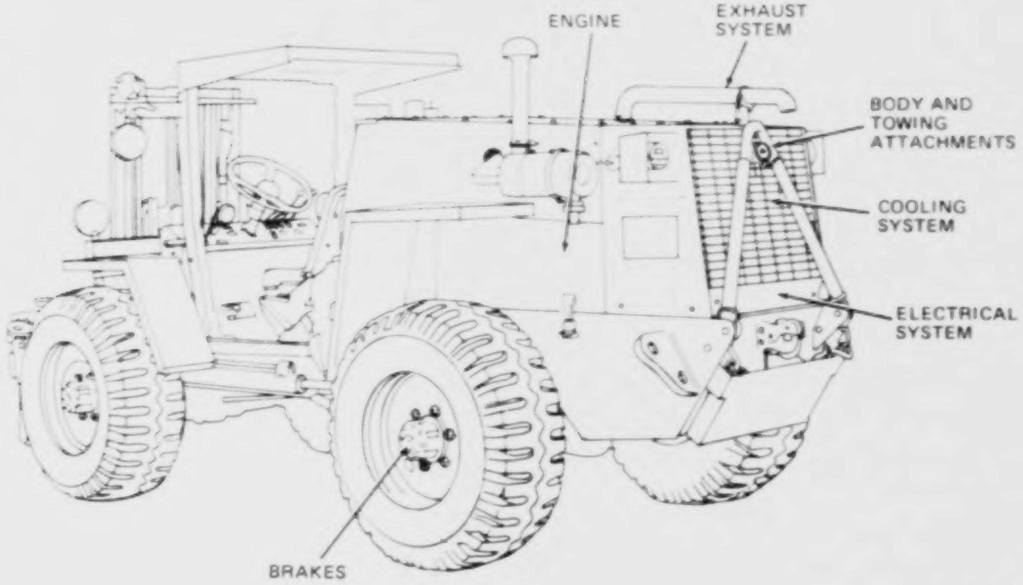
4. Let's assume you've found that the electric fuel pump is bad. The replacement procedure is in paragraph 2-15b. The procedure contains all the information you'll need to replace the electric fuel pump. First check the introductory material. It tells you what you'll need before you start the job. Below the introductory material is an assembled view of the vehicle showing the approximate location of the electric fuel pump and an exploded-view illustration which shows you how to take it out and put it back in. The text which follows the illustration tells you how to do the job.

5. If on the other hand, you know what the problem is and its cause, refer to the alphabetical index located at the rear of this manual and find the name of the part to be replaced and the paragraph number in which maintenance procedures will be found. For example, the engine is overheating, on filling the radiator with water you see that water is pouring out of the hoses indicating that the hose requires replacement. Refering to the alphabetical index under the listing hoses, cooling system, paragraph 2-17b is referenced. Turn to this paragraph for hose removal and installation procedures.


STEERING SYSTEM
HYDRAULIC LIFT SYSTEM
FUEL SYSTEM
AXELS AND WHEELS
TRANSMISSION AND DRIVE SHAFTS

RIGHT FRONT VIEW

TA127506


ENGINE
EXHAUST SYSTEM
BODY AND TOWING ATTACHMENTS
COOLING SYSTEM
ELECTRICAL SYSTEM
BRAKES

LEFT REAR VIEW

TA127507

MHE 237 forklift truck

CHAPTER 1

INTRODUCTION

CHAPTER OVERVIEW

The purpose of this chapter is to give your standard data required in all manuals, to familiarize you with the purpose and capabilities of the forklift truck and to give you a brief description of the different systems and components of the forklift truck.

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1-1. SCOPE

a. Type of Manual. Organizational, Direct Support, and General Support Maintenance Manual, including Repair Parts and Special Tools list.

b. Model Number and Equipment Name. MHE 237 Rough Terrain 4,000 Pound Capacity, Articulated Frame Steer, Pneumatic Tire, Diesel Engine Driven Forklift Truck.

c. Purpose of Equipment. Handle, transport, and stack materiels on various types of terrain. The forklift truck has a capacity of 4,000 pounds at 24-inch load center and can lift the load to a maximum height of 100-inches.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

1-3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Refer to TM 750-244-6.

1-4. ADMINISTRATIVE STORAGE

Refer to TM 740-93-1.

1-5. REPORTING OF ERRORS

You can improve this publication by calling attention to errors, recommending improvements, and by stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Forms) should be mailed directly to Commander, U. S. Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, MI 48090. A reply will be furnished directly to you.

1-6. WARRANTY INFORMATION

Refer to TB 10-2300-295-15-18 for warranty information.

1-7. ORIENTATION

The lifting forks are mounted on the front of the vehicle and the engine faces the rear. Controls for operating the lifting forks (tilting, rotating, lowering, side shifting of the lifting forks) are located to the right when you're sitting in the operator's seat.

1-8. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-9. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list located in Appendix C of this manual.

1-10. LIST OF ABBREVIATIONS

Refer to the Glossary, Appendix G, for a list of abbreviations used in this publication.

Section II. EQUIPMENT DESCRIPTION AND DATA

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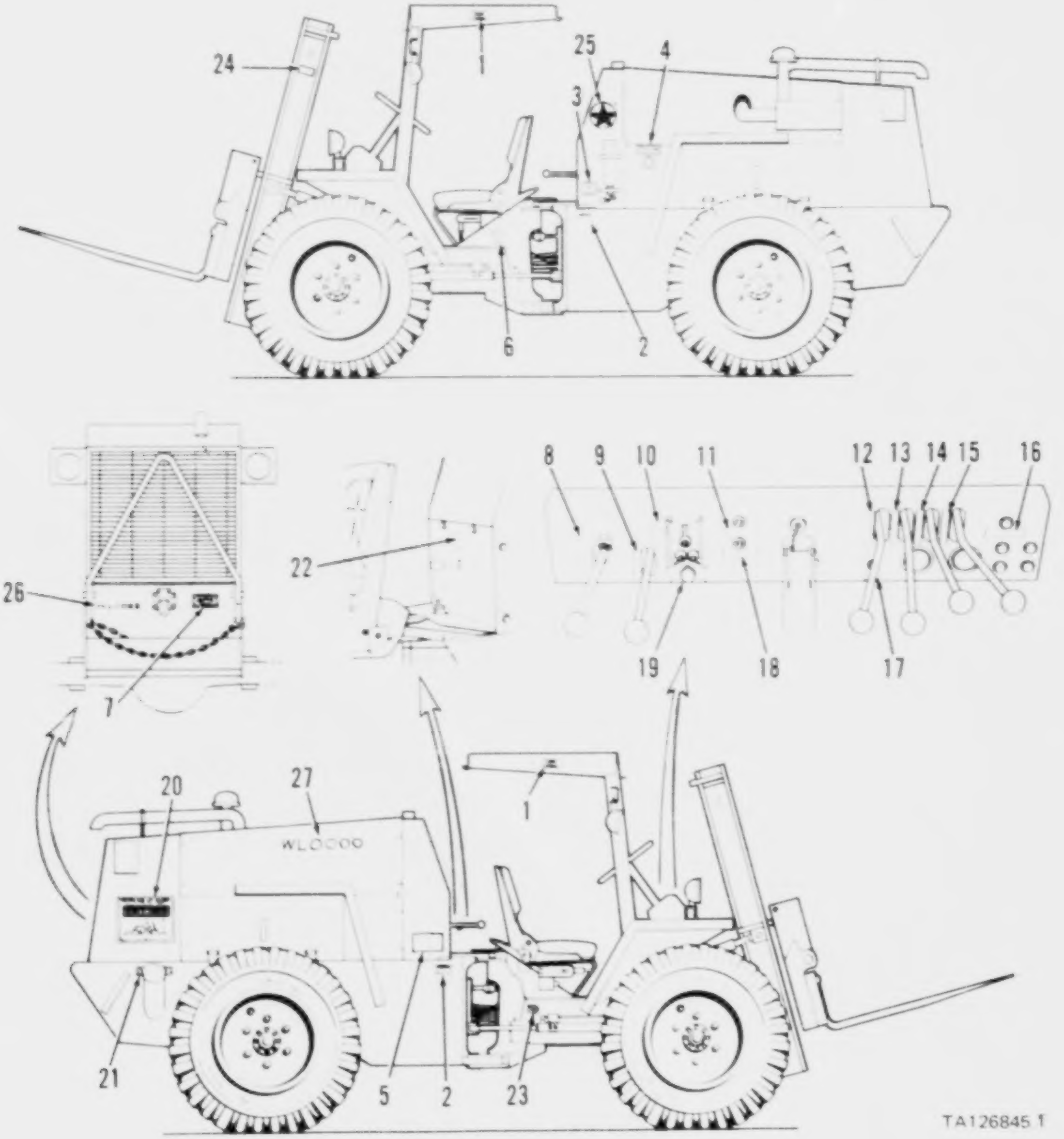
1-11. TABULATED DATA

Refer to the separate Operator's Manual, TM 10-3930-638-10, for the following tabulated data: Equipment Purpose, Capabilities and Features; Location and Description of Major Components; and Performance Data (including capacities, dimensions and weight).

1-12. DATA, INSTRUCTION AND WARRANTY PLATES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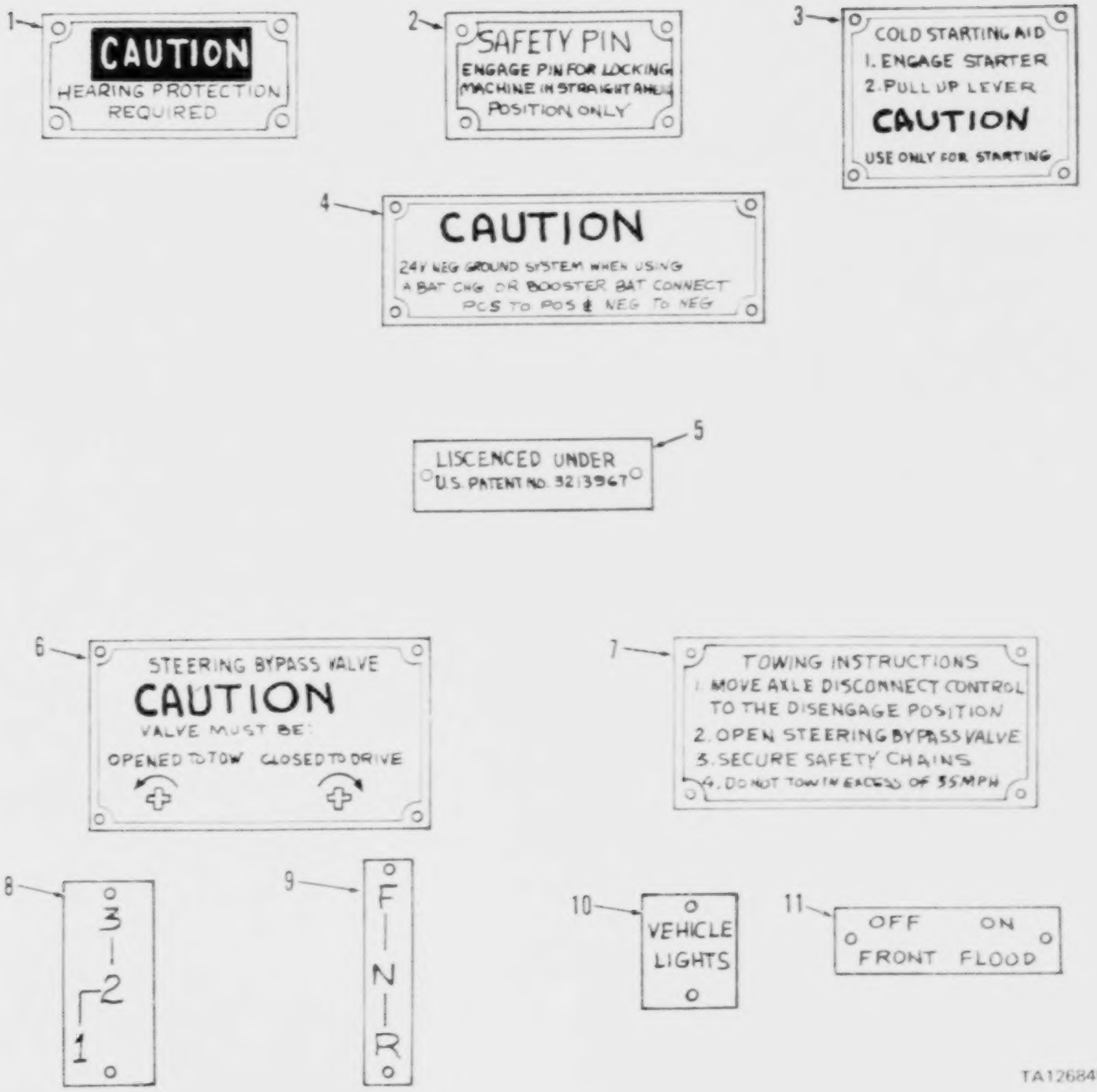
1-12. DATA, INSPECTION AND WARRANTY PLATES (cont)


1
CAUTION
HEARING PROTECTION REQUIRED
2
SAFETY PIN
ENGAGE PIN FOR LOCKING MACHINE IN STRAIGHT AHEAD POSITION ONLY
3
COLD STARTING AID
1. ENGAGE STARTER
2. PULL UP LEVER
CAUTION
USE ONLY FOR STARTING
4
CAUTION
24V NEG GROUND SYSTEM WHEN USING A BAT CHG OR BOOSTER BAT CONNECT POS TO POS & NEG TO NEG
5
LISCENCED UNDER
U.S. PATENT NO. 3213967
6
STEERING BYPASS VALVE
CAUTION
VALVE MUST BE:
OPENED TO TOW
CLOSED TO DRIVE
7
TOWING INSTRUCTIONS
1. MOVE AXLE DISCONNECT CONTROL TO THE DISENGAGE POSITION
2. OPEN STEERING BYPASS VALVE
3. SECURE SAFETY CHAINS
4. DO NOT TOW IN EXCESS OF 35 MPH
8
3
2
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9
F
N
R
10
VEHICLE LIGHTS
11
OFF
ON
FRONT
FLOOD

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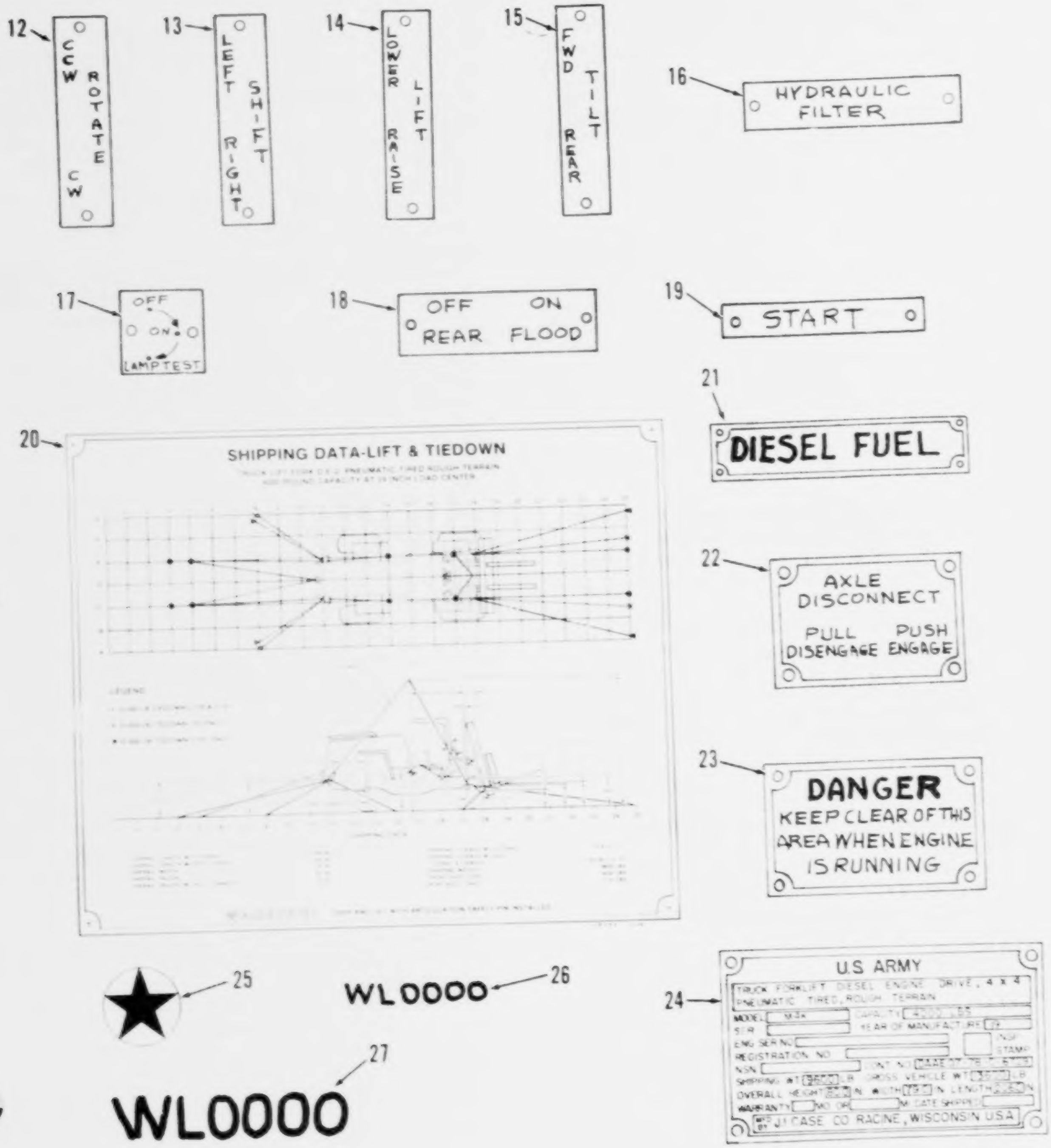
1-12. DATA, INSPECTION AND WARRANTY PLATES (cont)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CCW
ROTATE
CW
13
LEFT
SHIFT
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14
LOWER
LIFT
RAISE
15
FWD
TILT
REAR
16
HYDRAULIC
FILTER
17
OFF
ON
LAMP TEST
18
OFF
ON
REAR
FLOOD
19
START
20
SHIPPING DATA-LIFT & TIEDOWN
LEGEND
21
DIESEL FUEL
22
AXLE
DISCONNECT
PULL
DISENGAGE
PUSH
ENGAGE
23
DANGER
KEEP CLEAR OF THIS
AREA WHEN ENGINE
IS RUNNING
24
U.S ARMY
TRUCK FORKLIFT DIESEL ENGINE DRIVE, 4 x 4
PNEUMATIC TIRED, ROUGH TERRAIN
MODEL
CAPACITY
4000 LBS
SER
YEAR OF MANUFACTURE
ENG SER NO
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1-13. EQUIPMENT DATA

Engine	
Manufacturer	Case
Model number	G207D
Type	4 stroke compression ignition diesel
Fuel system	Fuel injected
Horsepower (maximum bhp at 2200 RPM)	60
Horsepower (SAE net at 2200 RPM)	55
Number of cylinders	4
Bore	4.0 inches
Stroke	4-1/8 inches
Compression ratio	16.5 to 1
Total displacement — cubic inches	207
Firing order — right hand rotation	1-3-4-2
Number of main bearings	5
Oil filter	Full flow
Fan	17-inch, 6 blade, pusher
Governor	Centrifugal, variable speed
Starter	
Manufacturer	Delco Remy
Model number	1109051
Clutch	Sprag type
Alternator	
Manufacturer	Delco Remy
Model number	1103123
Rating	40 amp
Air Cleaner	
Manufacturer	Donaldson
Model number	FWG06-5131
Type	Dry
Transmission	
Manufacturer	Clark
Model	11.2 HR18340
Type	Full power shift
Ratio	
1st, forward and reverse	10.81:1
2nd	4.73:1
3rd	1.58:1
Torque converter (Integral with transmission)	
Manufacturer	Clark
Model	11.2 Integral
Stall ratio	2.6:1
Axles	
Manufacturer	Rockwell
Model	
Front	D-140-FSHX18
Rear	D-140-FSHX18
Final axle ratio	6.80:1
Tires	
Size	15 x 19.5
Type	8 ply non-directional duplex
Normal tire pressure	45 PSI
Hydraulic pump	
Manufacturer	Cessna
Model	X24501-RAC
Type	Gear
Flow (at 2000 RPM) at 2000 PSI	11.4 GPM
Pressure	2500 PSI
Steering Gear	
Manufacturer	TRW
Model	HGA-32
Type	Hydrostatic
Hydraulic control valve	
Manufacturer	Gresen
Model	V20-546-A
Type	Open center, parallel circuit
Relief setting	N/A
Hydraulic cylinders	
Tilt	3 inch diameter x 12.17 inch stroke x 1.5 inch rod
Lift	2 stage
Steering	2.12 inch diameter x 15 inch stroke x 1.25 inch rod
Side shift (mast)	2.5 inch diameter x 22.12 inch stroke x 1.25 inch rod
Rotation (fork carrier)	2.5 inch diameter x 7.2 inch stroke x 1 inch rod
Electrical system	
Voltage	24
Ground	Neg
Batteries	2-12 volt
Number of headlights, standard and blackout	5
Number rear floodlights	2
Type headlights, blackout headlights and rear floodlights	Sealed beam
Number of taillights (combination tail, blackout and stoplight)	4 (2 Service, 2 Blackout)

Section III. PRINCIPLES OF OPERATION

	Para
Forklift Truck	1-14
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Fuel System	1-16
Exhaust System	1-17
Cooling System	1-18
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Transmission and Drive Shafts	1-20
Axles and Wheels	1-21
Brakes	1-22
Steering System	1-23
Body and Towing Attachments	1-24
Hydraulic Lift System	1-25

1-14. FORKLIFT TRUCK

a. Engine. The diesel engine is an internal combustion power unit in which the heat of diesel fuel is converted into work in the engine cylinders. The engine relies on the heat of compressed air to ignite the fuel. Fuel flow and engine speed are controlled by the fuel injection pump governor and fuel injectors.

b. Fuel System. Fuel is drawn from fuel tank by electric fuel pump through an in-line fuel filter, filtered by primary and final fuel filters, routed to fuel injection pump and then applied to fuel injectors where the fuel is injected into the engine cylinders.

c. Exhaust System. Engine combustion by-products are channeled through the exhaust manifold, muffler and exhaust pipe. The muffler aids in quieting engine noise.

d. Cooling System. Provides cooling water to engine. Water is circulated through engine by water pump which is belt driven by crankshaft pulley. Transmission oil cooler is located in front of radiator. Radiator is equipped with coolant recovery system.

e. Electrical System. 24 Volt system with negative ground. Power provided by two batteries. Alternator is mounted on, and driven by engine. Ignition switch controls application of power to main light switch and starter motor.

f. Transmission and Drive Shafts. Three speeds in both forward and reverse, has declutch feature which permits neutralizing transmission, equipped with axle disconnect. Three drive shafts used to transmit power to front and rear axles.

g. Axles and Wheels. Single reduction type axles; pneumatic tires. Front axle is rigidly mounted; rear axle is trunnion mounted.

h. Brakes. Service brakes consist of drum and shoe hydraulic wheel brakes on front and rear wheels for stopping the truck. A hydraulic brake valve is mounted under the front chassis and provides power assist for service brakes. Parking brake is mounted on output shaft of transmission.

i. Steering System. Consists of hydraulic steering gear, steering wheel, and two steering cylinders one mounted on each side of truck. Power assist provided by hydraulic pump mounted on, and driven by, transmission.

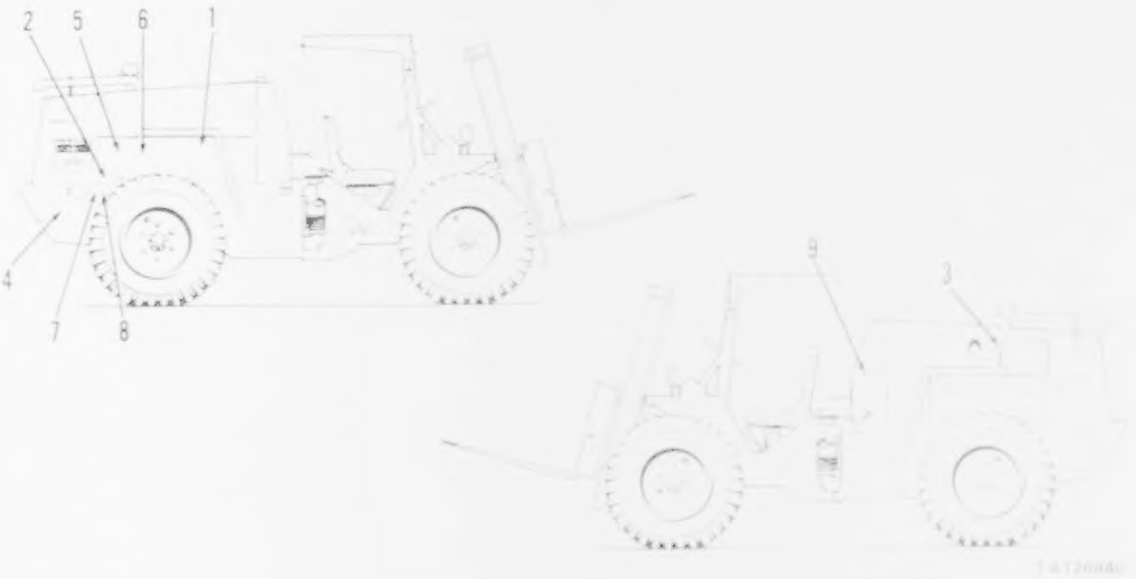
j. Body and Towing Attachments. Chassis is comprised of front chassis and rear chassis connected together by pivot pins. This enables steering to be accomplished by pivoting of front and rear chassis on pins by means of a steering cylinder mounted on each side of chassis to front and rear chassis. Pintle hook, and tow bar and chains, all located at rear enable towing to be accomplished.

k. Hydraulic Lift System. Hydraulic power supplied by hydraulic pump mounted on, and driven by, transmission. Hydraulic oil routed through hoses to control valve which controls flow of oil to lift cylinder, and to and from tilt cylinders, side shift cylinder, and rotation cylinder.

1-15. ENGINE

The engine is a four cylinder, in-line, four-stroke-cycle, valve-in-head diesel engine. Air enters the intake manifold through a dry-type air cleaner. An ether injection arrangement is connected to the intake manifold for quick starting of the engine during cold weather.

1-16. FUEL SYSTEM



1. FUEL INJECTORS. Four used, closed end, differential pressure, hydraulically operated, hole type injector.

2. ELECTRIC FUEL PUMP. Operates on 24 Volts; pumps fuel from fuel tank through in-line fuel filter, and to fuel injection pump through primary and final fuel filters.

3. AIR CLEANER. Dry type air cleaner. Filters air before air is applied to intake manifold.

4. FUEL TANK. 27 gallon capacity; part of rear chassis.

5. FUEL INJECTION PUMP. Fuel from primary and final fuel filters is routed to fuel injection pump where fuel is metered accurately and applied to each cylinder at high pressure through fuel injector nozzles at precisely timed intervals. Fuel metering is controlled by the throttle shaft lever, which is connected by cable to operator's accelerator pedal. Speed regulating governor mounted at top of fuel injection pump. Equipped with electrical solenoid for positive fuel shut-off.

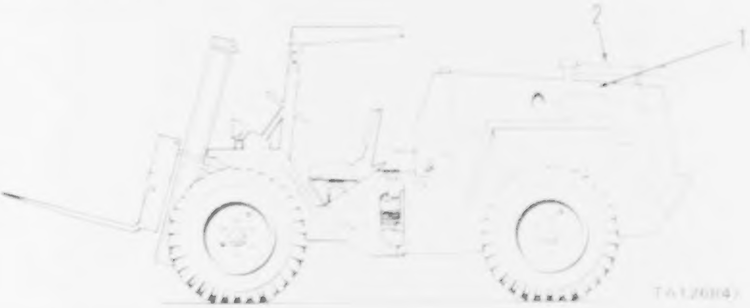
6. FUEL FILTERS. Primary and final fuel filters remove fuel oil impurities which may damage fuel injection pump and/or fuel injectors.

7. FUEL STRAINER. Located at fuel tank. Blocks passage of sediment to electric fuel pump.

8. IN-LINE FUEL FILTER. Filters fuel before fuel enters electric fuel pump.

9. QUICK START KIT. Ether injection arrangement for cold starting of engine. Connected by tube to intake manifold.

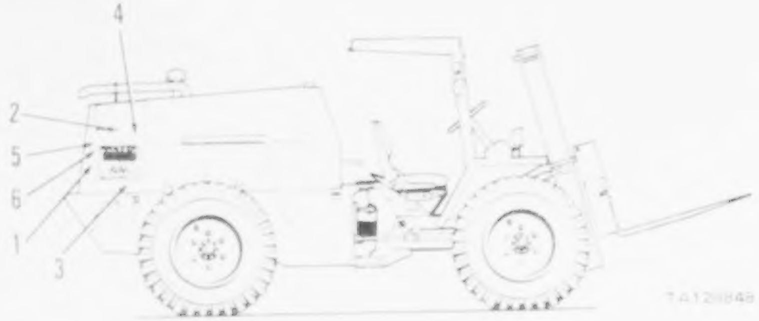
1-17. EXHAUST SYSTEM



1. MUFFLER. Muffles engine noise. Mounted on top of engine.

2. EXHAUST PIPE. Channels engine exhaust smoke combustion by-products from engine to rear of truck.

1-18. COOLING SYSTEM



1 RADIATOR. Mounted at rear of truck; cools engine coolant. Includes a coolant recovery system.

2 THERMOSTAT AND HOUSING. Mounted on front of engine at rear of truck. Thermostat opens at 180 degrees F.

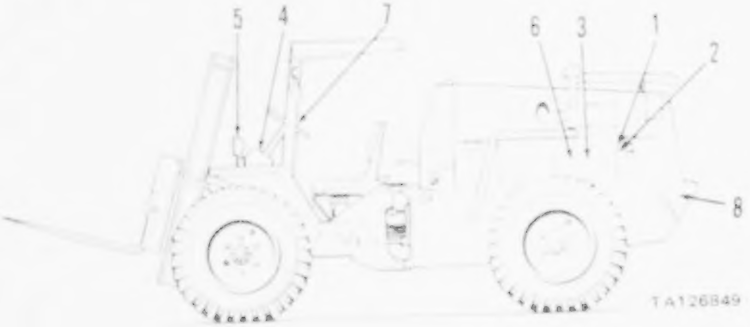
3 HOSES. Two hoses route coolant to and from radiator; one hose connected between top of radiator to top of water pump; other hose connected from bottom of radiator to side of water pump.

4 WATER PUMP. Driven by belt from crankshaft pulley.

5 FAN. Mounted on water pump pulley; located behind radiator.

6 DRIVE BELT. Installed between engine crankshaft, water pump pulley and alternator pulley; drives water pump and alternator.

1-19. ELECTRICAL SYSTEM



1 ALTERNATOR. 40 ampere; charges batteries and supplies current for additional electrical power.

2 DRIVE BELT. Drives alternator through engine crankshaft pulley.

3 STARTER MOTOR. Electric motor with an over running clutch. Solenoid is mounted on starter with an enclosed shifting mechanism.

4 INSTRUMENT PANEL. Refer to paragraphs 1-19a and 1-19b for a description of gages, lights, and switches mounted on instrument panel.

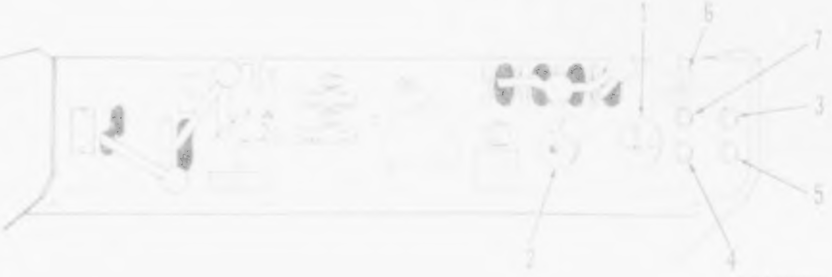
5 LIGHTS. Mounted at rear of truck are two flood lights, two stop and tail lights, and two blackout stop and tail lights. Mounted at front of truck are four flood lights and one blackout light. Operation of all lights is controlled by VEHICLE LIGHTS switch mounted on instrument panel plus front and rear flood lights have individual switches.

6 SENDING UNITS. Includes oil pressure sending unit mounted on right of engine and fuel level sending unit mounted in fuel tank.

7 HORN AND SWITCH. Electric horn operates from 24 Volts and is mounted at front of truck; horn switch located in steering wheel horn button applies 24 Volts to horn when depressed.

8 BATTERIES. Two 12 Volt batteries connected in series giving a 24 Volt electrical power supply.

a. Instrument Panel Gages and Indicators.



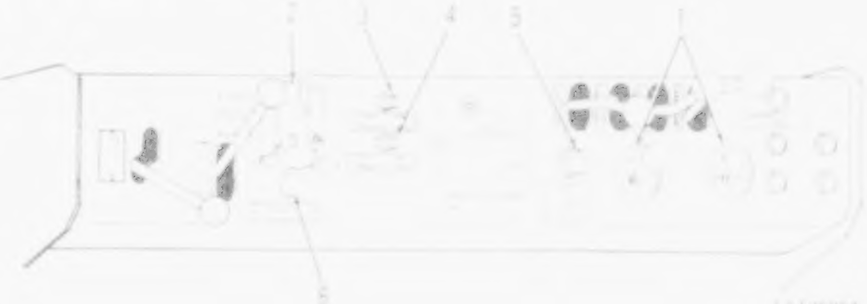
TA120050

1. OIL PRESSURE GAGE. Indicates engine oil pressure and is electrically connected to engine oil pressure sender located on right side of engine.
2. FUEL GAGE. Indicates quantity of fuel in fuel tank; electrically connected to fuel level sender located on top of fuel tank.
3. ENGINE OIL PRESSURE INDICATOR. Illuminates indicating low oil pressure; electrically connected to engine oil pressure switch located on right side of engine near fuel filters. Indicator illuminates when switch closes at decreasing pressure of 8 ± 2.5 PSI.
4. ENGINE WATER TEMPERATURE INDICATOR. Illuminates indicating engine is overheated; electrically connected to engine temperature switch located in cylinder head. Indicator illuminates when switch closes at 208 degrees F.
5. ALTERNATOR INDICATOR. Illuminates indicating battery is not recharging; connected to terminal 1 of alternator.
6. HYDRAULIC FILTER INDICATOR. Illuminates indicating hydraulic filter is clogged and requires replacement; electrically connected to hydraulic filter switch located in filter head. Indicator illuminates when switch closes at 20 ± 5 PSI increasing pressure.
7. TRANSMISSION TEMPERATURE INDICATOR. Illuminates indicating transmission is overheated; electrically connected to transmission temperature switch located in right side of transmission. Indicator illuminates when switch closes at 248 degrees F.

NOTE

HYDRAULIC FILTER, transmission temperature, and engine temperature indicators will illuminate when ignition switch is placed in LAMP TEST position.

b. Instrument Panel Switches and Gage Lights.



TA120051

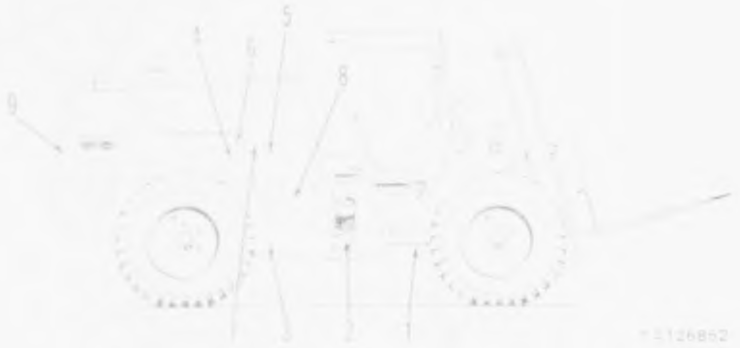
1. GAGE LIGHTS. Provide illumination of oil pressure and fuel gages; lamps are contained within these gages and are controlled by VEHICLE LIGHTS switch.
2. VEHICLE LIGHTS SWITCH. Consists of three separate sections: main switch, auxiliary switch, and mechanical lock. Main switch controls application of power to black out tail and stop light, stop light switch, service tail light, and front and rear flood light switches. Auxiliary switch controls application of power to gage lights and brightness of these lights, and power to service tail lights. Mechanical lock prevents main and auxiliary switches from applying power to lights except black out tail lights.
3. FRONT FLOODLIGHTS SWITCH. Applies power to illuminate front flood lights.
4. REAR FLOOD LIGHTS SWITCH. Applies power to illuminate rear flood lights.

b. Instrument Panel Switches and Gage Lights (cont).

5. IGNITION SWITCH. Four position key switch: unmarked position (key turned to left) applies power to VEHICLE LIGHTS switch enabling lights to be turned on; OFF position disconnects power from ignition and light system; ON position applies power to VEHICLE LIGHTS switch, gages, indicators (oil pressure and alternator lamps will illuminate), fuel pump, fuel injection pump, back-up alarm switch, and START switch; LAMP TEST position applies power to illuminate HYDRAULIC FILTER, transmission temperature, and engine temperature indicators.

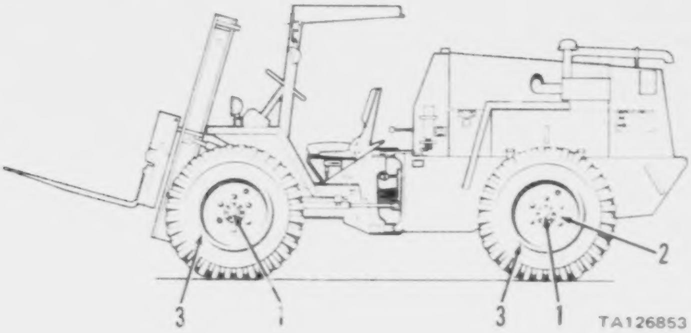
6. START SWITCH. Applies power to energize starter relay by means of lockout relay and neutral start switch. With starter relay energized, starter solenoid energizes, in turn, cranking starter motor to start engine.

1-20. TRANSMISSION AND DRIVE SHAFTS



1. FRONT DRIVE SHAFT. Connected between center drive shaft and front axle; connected to front axle yoke by universal joint and to center drive shaft by a yoke with internal splines. Rear of front drive shaft is supported by a bearing.
2. CENTER DRIVE SHAFT. Connected between transmission output shaft and front drive shaft. Connection accomplished by universal joints.
3. REAR DRIVE SHAFT. Connected between transmission output shaft and rear axle by universal joints.
4. TORQUE CONVERTER. Integral part of transmission; multiplies engine power.
5. TRANSMISSION. Consists of torque converter, transmission, charging pump and filter, control valve assembly, modulation valve, and parking brake. Includes declutch feature which neutralizes transmission. This accomplished by declutch valve spool in control valve assembly. Flow of hydraulic oil to declutch valve spool is controlled by declutch valve, which is mechanically linked to operator's declutch pedal.
6. CHARGING PUMP AND FILTER. Draws oil from transmission sump through oil suction screen and directs the oil through pressure regulating valve and filter. Filter removes impurities from oil.
7. CONTROL VALVE ASSEMBLY. Directs oil under pressure to the desired directional and speed clutch. Directional and speed control valves connected by push-pull type cables to operator's transmission direction and speed selector levers.
8. AXLE DISCONNECT. Controls engagement and disengagement of transmission drive to front and rear axles. Pulling lever outward disconnects drive to front and rear axles; pushing lever inward engages drive. This is used only when the truck is to be towed to a new location.
9. TRANSMISSION OIL COOLER. Mounted at rear of truck, in front of radiator; cools transmission hydraulic oil.

1-21. AXLES AND WHEELS

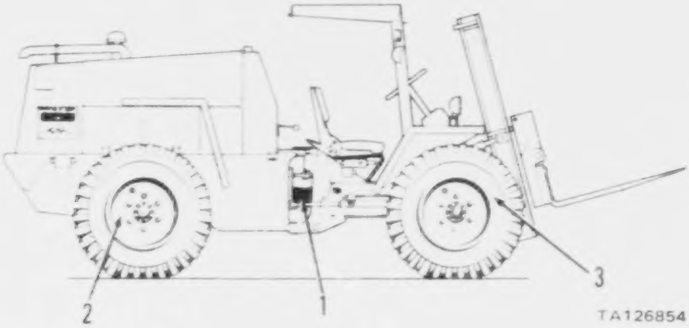


1. FRONT AND REAR AXLES. Single reduction type driven by propeller shafts; front axle is rigidly mounted; rear axle is trunnion mounted. Axle includes differential carrier and drum type brakes on each wheel.

2. DIFFERENTIAL CARRIER. Integral part of axle; single reduction unit employs a heavy duty spiral bevel gear.

3. RIMS AND TIRES. Heavy duty steel rims; pneumatic tires, 15 by 19.5, 8 ply tubeless.

1-22. BRAKES

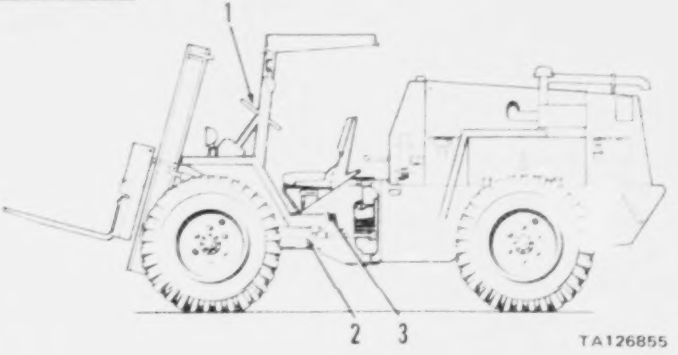


1. PARKING BRAKE. Located on transmission output shaft: drum and shoe type brake. Actuated by lever located next to operator's seat and connected by cable to parking brake actuating lever.

2. SERVICE BRAKES. Floating shoe and drum hydraulic brake located on each wheel. Actuation of the brakes permits brake shoes to center themselves in brake drum.

3. HYDRAULIC BRAKE VALVE. Consists of power section (provides power assist to service brakes) and master cylinder section. Power assist section connected by plunger to service brake pedal.

1-23. STEERING SYSTEM

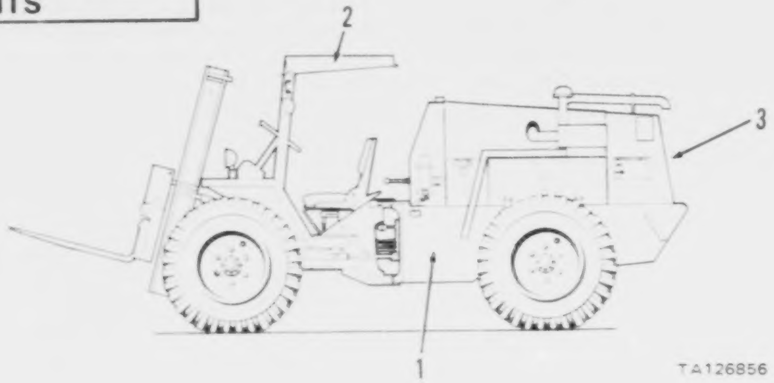


1. STEERING GEAR ASSEMBLY. Consists of steering column and rotary hydrostatic valve; has four hydraulic connections. Operated by moving steering wheel attached to shaft of steering column. When turned, steering gear controls flow of hydraulic oil to and from steering cylinders. Connections for pump pressure line, return line, and right and left turn oil flow to steering cylinders. Lines from right and left ports connect to tees; lines from tees to steering cylinders are cross-connected so that steering cylinders move in opposite directions when pressure is applied.

2. STEERING CYLINDERS. Two used, one mounted on each side of truck. Each end of cylinder attached to front and rear chassis.

3. STEERING BYPASS VALVE. When open, allows hydraulic oil to be transferred from one steering cylinder to the other for towing forklift truck.

1-24. BODY AND TOWING ATTACHMENTS

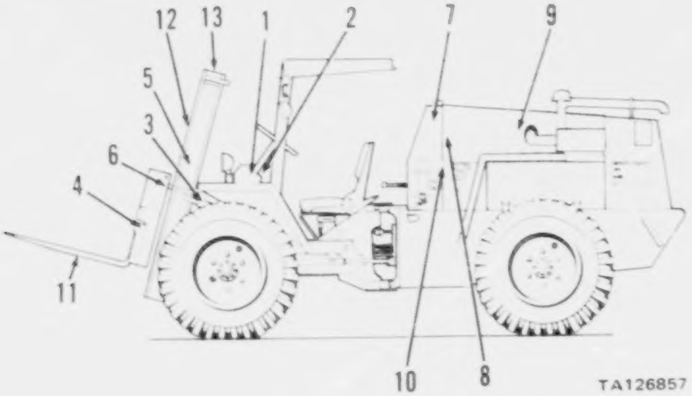


1. BODY. Constructed of heavy duty steel; consists of front and rear chassis to which are bolted front and rear fenders, engine hood and panels, and radiator shroud.

2. ROLL OVER PROTECTIVE STRUCTURE. Constructed of heavy duty steel; bolted to front chassis. Protects operator from falling material and injuries due to truck rolling over.

3. PINTLE AND TOW BAR. Located at rear of truck. Pintle hook, tow bar and chains used for towing truck or other vehicles.

1-25. HYDRAULIC LIFT SYSTEM



1. CONTROL VALVE. Controls hydraulic oil flow to lift, tilt, rotation, and side shift cylinders. Consists of an inlet and outlet section, four spool (working) sections and an end section. Each spool section controls a cylinder or pair of cylinders to move forks and mast.

2. CONTROL LEVERS. Positions control valve spools, in turn, allowing high pressure hydraulic oil to activate cylinders.

3. TILT CYLINDERS. Two used. Activated by control valve; tilts mast assembly forward or rearward. Minimum forward tilt is 11 degrees; minimum rearward tilt is 22 degrees.

4. SIDE SHIFT CYLINDER. One used. Activated by control valve; shifts fork carriage side-to-side.

5. LIFT CYLINDER. One used. Activated by control valve. Two stage cylinder; raises or lowers fork carriage.

1-25. HYDRAULIC LIFT SYSTEM (cont)

Includes fitting at top for bleeding air from system.
6. ROTATION CYLINDER. One used. Activated by control valve. Rotates forks 10 degrees minimum clockwise and counterclockwise from horizontal position.
7. HYDRAULIC RESERVOIR. Integral part of rear chassis; capacity is approximately 40 quarts. Located to rear of operator's seat; return oil filtered by 10 micron filter. Breather and oil filler located at top of reservoir; oil screen located at bottom of reservoir in oil suction line.
8. HYDRAULIC PUMP. Mounted on rear of, and driven by, transmission; also provides hydraulic power for steering system and service brakes. 11.4 gallon-per-minute capacity. 2500 PSI relief valve provided in hydraulic system to limit pump.
9. HYDRAULIC FILTER. Ten micron filter; filters return oil. Located at rear of hydraulic reservoir. When clogged, HYDRAULIC FILTER indicator on instrument panel illuminates. Equipped with automatic bypass; opens at not less than 2 PSI and permits full flow at 3.5 PSI.
10. HYDRAULIC SCREEN. Located at bottom of hydraulic reservoir in hydraulic pump suction line. Filters hydraulic oil before it reaches hydraulic pump.
11. LIFTING FORKS. Two used; 40 inch forks. Constructed of heavy-duty steel.
12. LIFT CHAINS. Two used; connected at one end to inner mast, reeved over chain rollers and connected at other end to carriage. Chains raise carriage.
13. MAST ASSEMBLY. Raises and lowers carriage by means of lift chains. Free lift height (height of forks without increased mast height) is not less than 48 inches. Consists of outer and inner mast. Includes mast latch pin used to latch outer and inner mast between zero to 12 inches height of lifting forks; disengages at over 12 inches height of lifting forks. Ensures free lift travel of not less than 48 inches.

CHAPTER 2
ORGANIZATIONAL MAINTENANCE PROCEDURES

CHAPTER OVERVIEW

The purpose of this chapter is to provide you with all needed instructions and additional information to help you at the organizational level keep the equipment in good repair.

Index

2-1. CHAPTER INDEX

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I	Service Upon Receipt	2-1
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III	Troubleshooting Index	2-7
IV	Engine Fuel, Exhaust and Cooling Systems and Gages Maintenance	2-11
V	Electrical System Maintenance	2-98
VI	Power Train Maintenance	2-194
VII	Brake System Maintenance	2-259
VIII	Wheels and Steering Maintenance	2-319
IX	Body, Cab and Roll Over Protective Structure Maintenance	2-352
X	Hydraulic Lift System Maintenance	2-389

Section I. SERVICE UPON RECEIPT

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Handling New Equipment	2-2
Servicing New Equipment	2-3
Initial Checkout and Adjustment	2-4
Movement to New Site	2-5

2-2. HANDLING NEW EQUIPMENT

a. Unloading Instructions. Vehicle is shipped unboxed and mobile on railcar with tiedowns over front and rear axles.

(1) Remove blocking from front, rear, and sides of vehicle.

(2) Perform paragraphs 2-2b, 2-3c and 2-4b(1).

(3) Remove tiedowns and remove vehicle from railcar.

b. Unpacking. Remove tape, banding, paper and other packing materials. If necessary, remove tape from exhaust pipe.

2-3. SERVICING NEW EQUIPMENT

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-3. SERVICING NEW EQUIPMENT (cont)

a. Removal of Protective Compounds. Remove preservative compounds from metal surfaces with cleaning solvent P-D-680. Check and ensure that all fill openings are clear.

b. Cleaning. Clean all dust and dirt from seat, instrument panel, wiring, engine, and radiator.

c. Lubrication. Lubricate vehicle in accordance with LO 10-3930-638-12.

2-4. INITIAL CHECKOUT AND ADJUSTMENT

a. Inspection.

(1) Inspect equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report (refer to DA PAM700-3 for instructions on preparation of DD Form 6).

(2) Check equipment against packing slip to see if shipment is complete. Report all discrepancies in accordance with instructions of TM 38-750.

(3) Check to see whether equipment has been modified.

(4) Check air cleaner for damage.

(5) Check gages and instruments on instrument panel for broken glass or other damage.

(6) Check control levers for bent or broken condition.

(7) Check engine accessories for loose connections and insecure mounting.

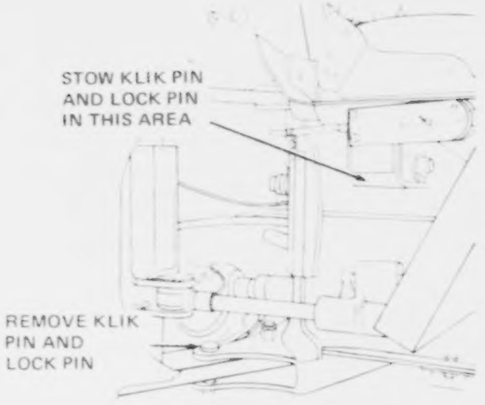
(8) Check wiring for loose connections, damaged insulation, and broken wires.

(9) Check fittings, lines, and hoses for cracks, loose connections, and broken or missing parts.

(10) Check that all drain plugs are securely tightened.

b. Service Check.

(1) Remove shipping klik pin and shipping lock pin from holes in front and rear chassis and stow in storage area as shown below.



(2) Perform before operation PMCS (refer to the separate Operator's Manual, TM 10-3930-638-10).

2-5. MOVEMENT TO NEW SITE

a. Driving. The vehicle may be moved under its own power without any special preparation or may be transported on a suitable truck and flat bed trailer. If transported on a flat bed trailer:

WARNING

Be sure ramp is securely fastened to flat bed trailer to prevent personnel injury and damage to equipment.

(1) Place ramps between flat bed trailer and ground.

NOTE

Ramps shall not provide a grade of more than 40 percent.

(2) Drive vehicle up ramps and position on flat bed trailer. Turn engine off and apply parking brake.

(3) Install blocking at front, rear, and sides of vehicle.

(4) Install tiedowns at front and rear axles (refer to plate 20, paragraph 1-12).

b. Towing. Vehicle is towed rearward using tow bar and chains located on rear. Special procedures shall be performed prior to towing operation. Refer to preparation for movement, Operator's Manual, TM 10-3930-638-10, for these procedures.

Section II. (ORGANIZATIONAL) PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-6. GENERAL

To insure that the forklift is ready for operation at all times, it must be inspected within designated intervals so that defects may be discovered and corrected before they result in serious damage or failure. All deficiencies and shortcomings will be recorded as well as the corrective action taken on DA Form 2404 at the earliest possible opportunity.

2-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. The item numbers of the table indicate the sequence of the PMCS. Perform at the intervals shown below:

(1) Do your (W) PREVENTIVE MAINTENANCE weekly.

(2) Do your (Q) PREVENTIVE MAINTENANCE quarterly (every three months).

(3) Do your (S) PREVENTIVE MAINTENANCE semiannually (every six months).

(4) Do your (A) PREVENTIVE MAINTENANCE annually (once every year).

b. If something doesn't work, troubleshoot it with the instructions in this manual or notify your supervisor.

c. Always do your preventive maintenance in the same order, so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

d. If anything looks wrong and you can't fix it, write it down on your DA Form 2404. If you find something seriously wrong, report it to direct support as soon as possible.

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with skin or clothing is made, flush with water. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

AIR Compressed air, used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personnel protective equipment (goggles shield gloves, etc.).

(1) Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (P-D-680) to clean metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) Bolts, nuts and screws: Check that they are not loose, missing, bent or broken. You can't try them all with a tool, of course, but look for chipped paint, bare metal or rust around bolt heads. Tighten any that you find loose.

(3) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to direct support.

(4) Electric wires and connectors: Look for cracked or broken insulation, bare wires and loose or broken connectors. Tighten loose connections and make sure the wires are in good condition.

(5) Hoses and fluid lines: Look for wear, damage and leaks. Make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, either correct it or report it to direct support (refer to MAC Chart).

e. It is necessary for you to know how fluid leaks affect the status of your equipment. The following are definitions of the types classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them and REMEMBER — When in doubt, notify your supervisor!

Leakage definitions for Organizational PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked inspected.
Class III	Leakage of fluid great enough to form drops that fall from the item being checked inspected.

2-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Legend

W-Weekly	S-Semiannually
Q-Quarterly	A-Annually

Item no.	Interval				ITEM TO BE INSPECTED Procedure
	W	Q	S	A	
					PERFORM OPERATOR CREW PMCS PRIOR TO OR IN CONJUNCTION WITH ORGANIZATIONAL PMCS IF:
					a. There is any delay between the daily operation of the equipment and the organizational PMCS.
					b. Regular operator is not assisting/participating.
1					AIR CLEANER
		•			Remove element and blow from inside out with low pressure air, replace if defective. Reset contamination indicator.
2					PARKING BRAKE LINKAGE
		•			Check linkage for loose or missing hardware. If adjusting knob does not tighten enough, adjust linkage.
3					SERVICE BRAKE
		•			Inspect brake pads, if 3/32 inches or less, or contaminated, replace. Reference page 2-282, para 2-43a.
		•			Check that brake pedal has 1/4-1 inch free travel and is at least two inches from floor when fully applied.
		•			Inspect the wheel cylinders for cracks, leaks, or broken end; inspect the brake shoe for cracks, and inspect backing plates for bends, cracks and loose rivets. Ref. page 2-282, para 2-43a. Inspect entire hydraulic brake system for leaks, cracked lines and worn hoses. Ref. page 2-290, para 2-43b. Replace all defective parts as required.
		•			Adjust service brake assembly. Reference page 2-286.1, para 2-43a.
4					AXLES
					WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.
		•			Service breathers. Remove and immerse in solvent P-D-680; dry with compressed air.
5					CHASSIS
		•			Check chassis, brackets, and mounting and ensure that they are in good condition and secure.
6					SIDE SHIFT FRAME
		•			Check that chain pulleys are securely fastened. Check side shift bars for excessive wear, deformation, and bent condition.
7					SPARK ARRESTING MUFFLER
		•			Blow carbon and soot from muffler (para. 2-16).

2-7. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Legend

W-Weekly
Q-Quarterly
S-Semiannually
A-Annually

Item no.	Interval				ITEM TO BE INSPECTED Procedure
	W	Q	S	A	
8					FUEL FILTERS
			●		Replace in-line, primary, secondary, and injection pump inlet filters.
9					FUEL STRAINER
				●	Remove strainer from fuel tank, clean, inspect, and replace if clogged, torn, or deformed.
10					COOLING SYSTEM
				●	Drain, flush, and refill radiator in accordance with TB 750-651.
11					PARKING BRAKE ASSEMBLY
				●	Check linings. If 1/8 inch or less, replace.
12					BRAKE MASTER CYLINDER
	●				Check fluid level. Add silicone brake fluid to within 1/2 inch of fill plug opening.
	●				Check interior of master cylinder cap for rust. Clean as necessary and coat with silicone brake fluid.
13				●	BATTERIES
					WARNING
					DO NOT SMOKE OR ALLOW ANY FLAME OR SPARK IN THE VICINITY WHILE CHECKING OR FILLING BATTERY. THE BATTERY GENERATES HYDROGEN, HIGHLY EXPLOSIVE GAS.
					CAUTION
					IN COLD WEATHER OPERATIONS, CHARGE BATTERY IMMEDIATELY AFTER ADDING WATER TO COMBINE THE WATER WITH BATTERY ELECTROLYTE TO PREVENT FREEZING. BE CAREFUL NOT TO OVERFILL WHEN SERVICING BATTERIES.
		●			a. Test battery to determine cell condition (Ref TM 9-6140-200-14
		●			b. Clean battery top and terminals. Insure all connections are tight.

Section III. TROUBLESHOOTING INDEX

This section contains a complete index of all troubleshooting data located within the manual. Included in the index is the paragraph/malfunction and page where the detailed troubleshooting procedure will be found.

	Para/Malfunction	Page
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Engine hard to start or will not start	2-9/1, 3-3/1	2-12, 3-2
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Engine stalls frequently or does not develop full power	2-9/5, 3-3/5	2-18, 3-4
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Low engine oil pressure	2-9/8	2-22
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Engine no-load governed speed incorrect	3-4/2	3-6
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Engine smokes blue or white	3-4/9	3-19
Fuel not reaching fuel injection pump	3-4/10	3-19
Fuel delivered from transfer pump but not to fuel injectors	3-4/11	3-20
Fuel reaching fuel injectors but engine will not start	3-4/12	3-22
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Section III. TROUBLESHOOTING INDEX (cont)

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Starter troubleshooting	3-10/1	3-90
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Service tail lights inoperative	2-24/4	2-109
Black out stop lights inoperative	2-24/5	2-109
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Section IV. ENGINE, FUEL, EXHAUST, AND COOLING SYSTEMS AND GAGES MAINTENANCE

This section contains the information you need to maintain the engine's:

- Cooling system
- Exhaust system
- Fuel system
- Quick start system
- Gages

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of organizational maintenance.

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Troubleshooting Symptom Index . . . 2-8
Engine Troubleshooting . . . 2-9
Fuel System Troubleshooting . . . 2-10
Exhaust System Troubleshooting . . . 2-11
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  Gage Bulb Replacement . . . 2-18a
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2-8. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
ENGINE		
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Engine hard to start or will not start (exhaust smoke)	2-9/2	2-15
Engine starts but will not run	2-9/3	2-15
Engine misfires	2-9/4	2-17
Engine stalls frequently or does not develop full power	2-9/5	2-18
Engine cranks but does not start when quick start is activated	2-9/6	2-21
Excessive oil consumption	2-9/7	2-21
Low engine oil pressure	2-9/8	2-22
Engine will not shut down	2-9/9	2-22
FUEL SYSTEM		
Low fuel pressure	2-10/1	2-23
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EXHAUST SYSTEM		
Excessive exhaust noise	2-11/1	2-24
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2-8. TROUBLESHOOTING SYMPTOM INDEX (cont)

	Para/Malfunction	Page
COOLING SYSTEM		
Engine overheats	2-12/1	2-25
Engine does not reach operating temperature	2-12/2	2-26
Cooling system not pressurized	2-12/3	2-26
GAGES		
Engine oil pressure gage does not indicate correct pressure	2-13/1	2-27
Fuel gage does not register	2-13/2	2-28
Fuel gage does not indicate correct fuel level	2-13/3	2-28

2-9. ENGINE TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

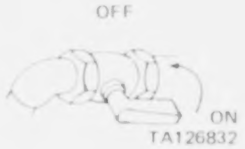
1. ENGINE HARD TO START OR WILL NOT START

Step 1. Check if air cleaner indicator red flag is in view.

a. If in view, depress reset button on top of indicator and check that red flag disappears from view. (If red flag does not disappear from view, replace air cleaner indicator as described in para 2-15c.) Crank engine and check if red flag is in view; if red flag is in view, service air cleaner (para 2-15c).

b. If red flag is not in view, proceed to step 2 below.

Step 2. Check if fuel shut-off valve is in closed position.



a. If fuel shut-off valve is in closed position, place in open position as shown.

b. If fuel shut-off valve is in open position, proceed to step 3 below.

Step 3. Check if there is fuel in fuel tank.

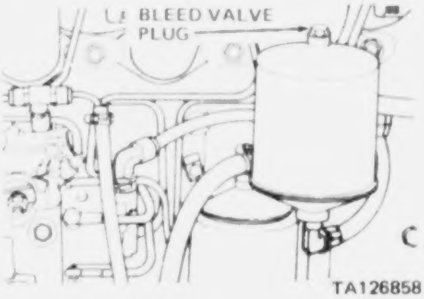
a. If no fuel in fuel tank, fill tank.

b. If fuel in fuel tank, proceed to step 4 below.

Step 4. Check for air in fuel system.

a. Place ignition switch in ON position.
Open bleed valve plug on top of secondary fuel filter allowing air to bleed out of both filters. When fuel, free of bubbles, starts to flow, close bleed valve plug and wipe parts free of fuel.
Place ignition switch in OFF position.

b. If no air in fuel system, proceed to step 5 below.



2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

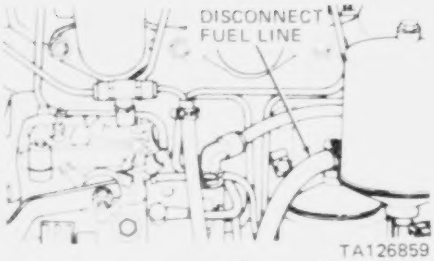
1. ENGINE HARD TO START OR WILL NOT START (cont)

Step 5. Check for leaks at fittings between fuel tank and fuel injection pump.

a. If leaks are observed, tighten or replace fittings (para 2-15d (2)).

b. If leaks are not observed, proceed to step 6 below.

Step 6. Disconnect fuel line at fuel filter head.
Place ignition switch in ON position and check if a slight buzz can be heard at electric fuel pump and if fuel is pumped out of disconnected line.



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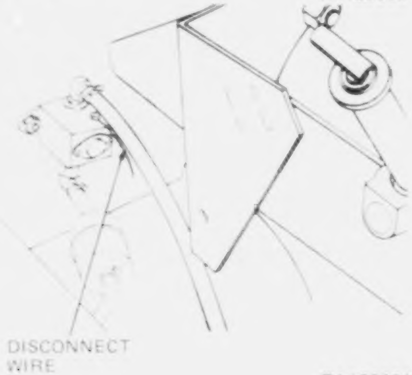
a. If slight buzz indicating electric fuel pump operation is not heard, disconnect wire at terminal on electric fuel pump and check for +24 Vdc between wire and chassis ground.

(1) If +24 Vdc is not obtained, troubleshoot electrical system (para 2-19).

(2) If +24 Vdc is obtained, replace electric fuel pump (para 2-15b).

b. If fuel is not pumped out of disconnected fuel line, remove lines and fittings between fuel tank and fuel filter head and clean/replace lines, in-line fuel filter, and/or fuel strainer (para 2-15).

c. If fuel is pumped out of disconnected fuel line, proceed to step 7 below.



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Step 7. Check for clogged fuel filters by disconnecting fuel line between fuel filter head and fuel injection pump at fuel injection pump.
Place ignition switch in ON position and crank engine.
Fuel should be pumped out of disconnected line.

a. If fuel is not pumped out of disconnected line, reconnect fuel line and service fuel filters (para 2-15e and 2-15f).

b. If fuel is pumped out of disconnected line, reconnect fuel line and proceed to step 8 below.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

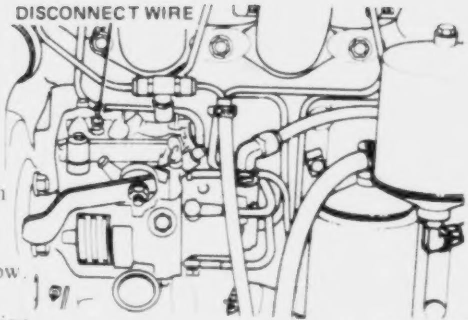
1. ENGINE HARD TO START OR WILL NOT START (cont)

Step 8. Disconnect wire at fuel injection pump terminal. With ignition switch in ON position, check for +24 Vdc between wire and chassis ground.

a. If +24 Vdc is obtained, reconnect wire to terminal and crack (open) a fuel injection line at fuel injection pump.
Crank engine and check if fuel is pumped through fuel injection pump.

(1) If fuel is pumped, proceed to step 9 below.

(2) If fuel is not pumped, replace fuel injection pump (notify direct support maintenance).



b. If +24 Vdc is not obtained, troubleshoot electrical system (para 2-19).

Step 9. Check for incorrect or contaminated fuel in fuel tank (if contaminated, fuel will have a milky white coloring).

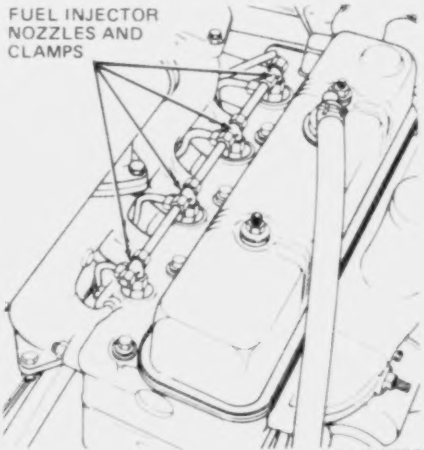
a. If fuel is contaminated, drain fuel tank, clean and fill with correct fuel(para 2-15d (1) and replace fuel filters (para 2-15e and 2-15f).
(Refer to current lubrication order for correct fuel.)

b. If fuel is not contaminated, proceed to step 10 below.

Step 10. Check for loose fuel injector nozzle.

a. If a fuel injector nozzle is loose, tighten clamp.

b. If fuel injector nozzles are not loose, proceed to step 11 below.



Step 11. Check for damaged fuel injector nozzle seal or damaged nozzle (notify direct support maintenance).

a. If fuel injector nozzle seal or nozzle is damaged, replace (para 3-6b; notify direct support maintenance).

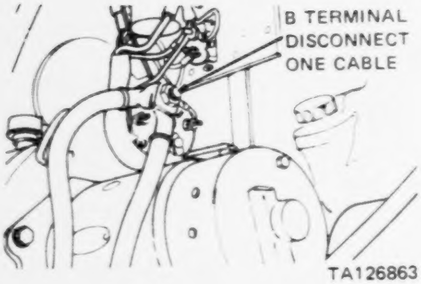
b. If fuel injector nozzle seal and nozzle check okay, proceed to step 12.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE HARD TO START OR WILL NOT START (cont)

Step 12. Disconnect ground cable from battery.
Disconnect positive cable from starter B terminal and connect to ammeter.
Connect a test cable from ammeter to starter B terminal.
Connect ground cable to battery
Place ignition switch in ON position and depress START pushbutton while observing ammeter.
Ammeter should indicate 75 to 95 amperes.



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a. If ammeter reading is higher than 95 amperes, replace starter (para 2-27a).

b. If ammeter reading is less than 75 amperes, check battery (para 2-20, MALFUNCTION 1, step 3). If battery checks good, replace battery cables (para 2-33b).

c. If ammeter reading is between 75 to 95 amperes, notify direct support maintenance.

2. ENGINE HARD TO START OR WILL NOT START (EXHAUST SMOKE)

NOTE

Also refer to MALFUNCTION 1, steps 1, 2, 7 through 9, and 11.

Step 1. Check for fuel leaks at fuel injector lines.

a. If fuel leaks are observed, tighten or replace lines (para 3-6a; notify direct support maintenance).

b. If fuel lines are okay, proceed to step 2 below.

Step 2. Remove radiator cap and observe coolant for gas bubbles while cranking engine.

If gas bubbles rising in coolant are observed, replace cylinder head gasket (para 3-5g; notify direct support maintenance).

3. ENGINE STARTS BUT WILL NOT RUN

Step 1. Check if air cleaner red flag is in view.

a. If in view, depress reset button on top of indicator and check that red flag disappears from view. (If red flag does not disappear from view, replace air cleaner indicator as described in paragraph 2-15c.)
Crank engine and check if red flag is in view; if red flag is in view, service air cleaner (para 2-15c).

b. If red flag is not in view, proceed to step 2 below.

Step 2. Check if there is fuel in fuel tank.

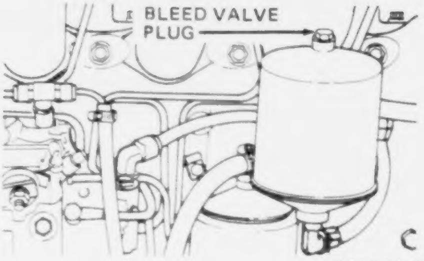
a. Fill fuel tank if no fuel in fuel tank.

b. If fuel in fuel tank, proceed to step 3 below.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE STARTS BUT WILL NOT RUN (cont)



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Step 3. Check for air in fuel system.

a. Place ignition switch in ON position.
Open bleed valve plug on top of secondary fuel filter allowing air to bleed out of both filters.
When fuel, free of bubbles, starts to flow, close bleed valve plug and wipe parts free of fuel.
Turn ignition switch off.

b. If no air in fuel system, proceed to step 4 below.

Step 4. Check for clogged fuel filters by disconnecting fuel line between fuel filter head and fuel injection pump at fuel injection pump.
Place ignition switch in ON position and crank engine.
Fuel should be pumped out of disconnected line.

a. If fuel is not pumped out of disconnected line, reconnect fuel line and service fuel filters (para 2-15e and 2-15f).

b. If fuel is pumped out of disconnected line, reconnect line and proceed to step 5 below.

Step 5. Check for incorrect or contaminated fuel in fuel tank (if contaminated, fuel will have a milky white coloring).

a. If fuel is contaminated, drain fuel tank, clean fill with correct fuel (para 2-15d(1)) and replace fuel filters (para 2-15e and 2-15f).
(Refer to current lubrication order for correct fuel.)

b. If fuel is not contaminated, proceed to step 6 below.

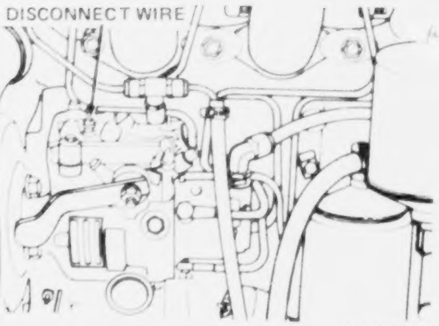
Step 6. Check throttle cable movement as an assistant depresses and releases accelerator cable.

a. If movement is not observed, repair or replace throttle/accelerator pedal linkage (para 2-15i).

b. If movement is observed, proceed to step 7 below.

Step 7. Disconnect wire at fuel injection pump terminal.
With ignition switch in ON position, check for +24 Vdc between wire and chassis ground.

a. If +24 Vdc is obtained, reconnect wire to terminal and crack (open) a fuel injector line at fuel injector pump.
Crank engine and check if fuel is pumped through fuel injection pump.



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2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE STARTS BUT WILL NOT RUN (cont)

Step 7. (cont)

(1) If fuel is pumped through injection pump, proceed to step 8.

(2) If fuel is not pumped through fuel injection pump, replace it (notify direct support maintenance).

b. If +24 Vdc is not obtained, troubleshoot electrical system (para 2-19).

c. If fuel is pumped out of disconnected fuel line, proceed to step 8 below.

Step 8. Check for fuel leaks at fuel injector lines.

a. If fuel leaks are observed, tighten or replace lines (para 3-6a; notify direct support maintenance).

b. If fuel lines are okay, proceed to step 9 below.

Step 9. Remove radiator cap, start engine, and observe coolant for gas bubbles.

If gas bubbles rising in coolant are observed, replace cylinder head gasket (para 3-5g; notify direct support maintenance).

4. ENGINE MISFIRES

Step 1. Check for incorrect or contaminated fuel in fuel tank (if contaminated, fuel will have a milky white appearance).

a. If fuel is contaminated, drain fuel tank, clean and fill with correct fuel (para 2-15d(1)) and replace fuel filters (para 2-15e and 2-15f).
(Refer to current lubrication order for correct fuel.)

b. If fuel is not contaminated, proceed to step 2 below.

Step 2. Operate engine for 15 minutes at idle speed.
Carefully and slowly remove radiator cap.
Check coolant temperature using a thermometer; be sure that thermometer does not touch any metal parts of radiator.
Coolant temperature shall be between 175 to 200 degrees F.

a. If coolant temperature is not between 175 to 200 degrees F, remove and test thermostat.

b. If coolant temperature is between 175 to 200 degrees F, proceed to step 3 below.

Step 3. Check for fuel leaks at fuel injector lines.

a. If fuel leaks are observed, tighten or replace lines (para 3-6a; notify direct support maintenance).

b. If fuel lines are okay, proceed to step 4 below.

2-9. ENGINE TROUBLESHOOTING (cont)

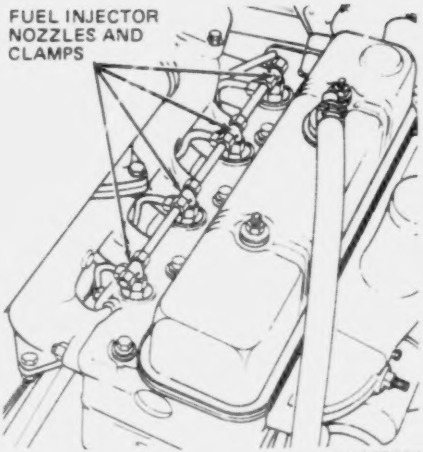
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. ENGINE MISFIRES (cont)

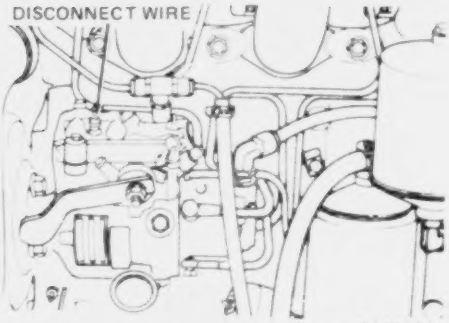
Step 4. Check for loose fuel injector nozzle.

a. If a fuel injector nozzle is loose, tighten clamp.

b. If fuel injector nozzles are not loose, proceed to step 5 below.



Step 5. Disconnect wire at fuel injection pump terminal. With ignition switch in ON position, check for +24 Vdc between wire and chassis ground.



a. If +24 Vdc is obtained, reconnect wire to terminal and crack (open) a fuel injector line at fuel injector pump.
Crank engine and check if fuel is pumped through fuel injection pump.

(1) If fuel is pumped through injection pump, notify direct support maintenance.

(2) If fuel is not pumped through fuel injection pump, replace it (notify direct support maintenance).

b. If +24 Vdc is not obtained, troubleshoot electrical system (para 2-19).

5. ENGINE STALLS FREQUENTLY OR DOES NOT DEVELOP FULL POWER

Step 1. Check if air cleaner indicator red flag is in view.

a. If in view, depress reset button on top of indicator and check that red flag disappears from view. (If red flag does not disappear from view, replace air cleaner indicator as described in para 2-15c.) Crank engine and check if red flag is in view; if in view, service air cleaner (para 2-15c).

b. If red flag is not in view, proceed to step 2 below.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ENGINE STALLS FREQUENTLY OR DOES NOT DEVELOP FULL POWER (cont)

Step 2. With engine operating at idle speed, squirt small amount of fuel on intake manifold where it contacts cylinder head.
Check if oil is drawn into intake manifold indicating intake manifold gasket is damaged.

a. If oil is drawn into intake manifold, remove and replace intake manifold gasket (para 2-14d).

b. If oil is not drawn into intake manifold, proceed to step 3 below.

Step 3. Check engine oil level dipstick for over filled engine crankcase.

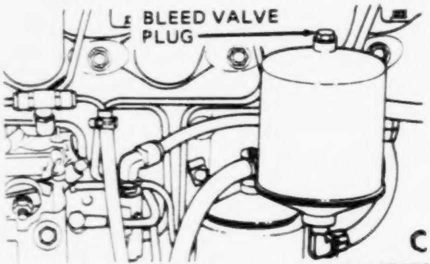
a. If engine crankcase is overfilled as indicated by dipstick, drain excess oil until level is just below FULL mark on dipstick (para 2-14b).

b. If engine oil level is okay, proceed to step 4 below.

Step 4. Check for air in fuel system.

a. Place ignition switch in ON position.
Open bleed valve plug on top of secondary fuel filter allowing air to bleed out of both filters.
When fuel, free of bubbles, starts to flow, close bleed valve plug and wipe parts free of fuel.
Turn ignition switch off.

b. If no air in fuel system, proceed to step 5 below.



Step 5. Check for incorrect or contaminated fuel in fuel tank (if contaminated, fuel will have a milky white coloring).

a. If fuel is contaminated, drain fuel tank, clean and fill with correct fuel (para 2-15d(1)) and replace fuel filters (para 2-15e and 2-15f).
(Refer to current lubrication order for correct fuel.)

b. If fuel is not contaminated, proceed to step 6 below.

Step 6. Check for clogged fuel filters by disconnecting fuel line between fuel filter head and fuel injection pump at fuel injection pump.
Place ignition switch in ON position and crank engine.
Fuel should be pumped out of disconnected line.

a. If fuel is not pumped out of disconnected line, reconnect fuel line and service fuel filters (para 2-15e and 2-15f).

b. If fuel is pumped out of disconnected line, reconnect fuel line and proceed to step 7 below.

2-9. ENGINE TROUBLESHOOTING (cont)

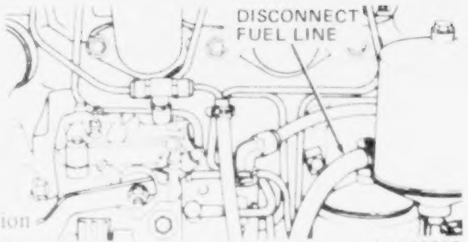
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

5. ENGINE STALLS FREQUENTLY OR DOES NOT DEVELOP FULL POWER (cont)

Step 7. Disconnect fuel line at fuel filter head.
Place ignition switch in ON position and check if a slight buzz can be heard at electric fuel pump and if fuel is pumped out of disconnected line.



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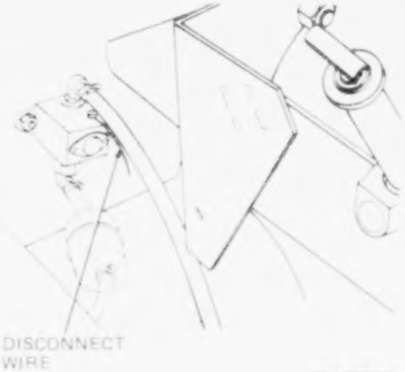
a. If slight buzz indicating electric fuel pump operation is not heard, disconnect wire at terminal on electric fuel pump and check for +24 Vdc between wire and chassis ground.

(1) If +24 Vdc is not obtained, troubleshoot electrical system (para 2-19).

(2) If +24 Vdc is obtained, replace electric fuel pump (para 2-15b).

b. If fuel is not pumped out of disconnected fuel line, remove lines and fittings between fuel tank and fuel filter head and clean/replace lines, in-line fuel filter, and/or fuel strainer (para 2-15).

c. If fuel is pumped out of line, reconnect line and proceed to step 8.



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Step 8. Operate engine for 15 minutes at idle speed.
Carefully and slowly remove radiator cap.
Check coolant temperature using a thermometer; be sure thermometer does not touch any metal parts of radiator.
Coolant temperature shall be between 175 to 200 degrees F.

a. If coolant temperature is not between 175 to 200 degrees, remove and test thermostat (para 2-17d).

b. If coolant temperature is between 175 to 200 degrees F, proceed to step 9 below.

Step 9. Check for correct adjustment of accelerator/throttle control (para 2-15i).

a. If adjustment of accelerator/throttle control is not correct, adjust (para 2-15i).

b. If accelerator/throttle control adjustment is okay, proceed to step 10 below.

Step 10. Remove drive belt from engine water pump (para 2-17f).
Start engine and operate at idle speed for five minutes maximum.
Check if engine power increases.

If engine power increases, replace water pump assembly (para 2-17e) and reinstall drive belt on water pump.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. ENGINE CRANKS BUT DOES NOT START WHEN QUICK START IS ACTIVATED

Step 1. Check that quick start cylinder is hand tight.

a. If cylinder is not hand tight, tighten.

b. If cylinder is hand tight, proceed to step 2 below.

Step 2. Check ether supply; press lever against valve and listen for hissing.

a. If hissing sound is not heard, replace empty cylinder (para 2-15h).

b. If hissing sound is heard, proceed to step 3 below.

Step 3. Check tubing for leaks or damage; listen for hissing sound when lever is pressed against valve.

a. If hissing sound is heard, replace tubing (para 2-15h).

b. If hissing sound is not heard, proceed to step 4 below.

Step 4. Check valve for damage.

Replace valve (para 2-15h).

7. EXCESSIVE OIL CONSUMPTION

Step 1. Check for engine oil leaks at cylinder head cover gasket, oil pan gasket, timing gear cover gasket, engine oil filter, and oil drain plug gasket.

a. If oil leaks are observed by engine oil filter and oil drain plug, tighten oil filter and replace oil drain plug gasket (para 2-14b).
If leaks are observed at other areas, notify direct support maintenance.

b. If oil leaks are not observed, proceed to step 2 below.

Step 2. Check if too light an engine oil is used.

a. If engine oil is too light, drain engine oil and replace engine oil filter (para 2-14c).
(Refer to current lubrication order for correct weight engine oil.)

b. If engine oil is okay, proceed to step 3 below.

Step 3. With engine operating, check oil pressure gage for excessively high pressure indication (normal oil pressure indication is between 50 to 70 PSI).

If oil pressure gage indication is excessively high, notify direct support maintenance.

2-9. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

8. LOW ENGINE OIL PRESSURE

Step 1. Check for engine oil leaks at engine oil filter and oil pan drain plug.

a. If leaks are observed, tighten oil filter, replace oil pan drain plug gasket.

b. If no leaks are observed, proceed to step 2 below.

Step 2. Check engine oil for dirty condition.
Remove dipstick, wipe it between thumb and forefinger and note if oil feels gritty and looks dirty.

a. If oil feels gritty and looks dirty, drain engine oil and replace engine oil filter (para 2-14c). (Refer to current lubrication order for correct weight oil.)

b. If oil is okay, proceed to step 3 below.

Step 3. Check if too light an engine oil is used.

a. If engine oil is too light, drain engine oil and replace engine oil filter (para 2-14c). (Refer to current lubrication order for correct weight oil.)

b. If engine oil is not too light, proceed to step 4 below.

Step 4. Check if oil pressure indicator light is illuminated when oil pressure gage indicates low oil pressure.

a. If oil pressure indicator is illuminated, notify direct support maintenance.

b. If oil pressure indicator is not illuminated, refer to gages troubleshooting (para 2-13).

Step 5. Check if oil pressure gage indicates normal oil pressure when oil pressure indicator is illuminated.

a. If oil pressure gage indicates normal oil pressure, troubleshoot electrical system (para 2-13).

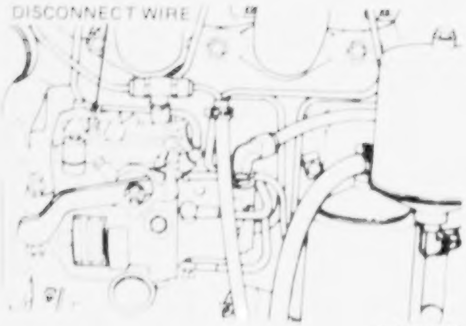
b. If oil pressure gage indicates low oil pressure, notify direct support maintenance.

9. ENGINE WILL NOT SHUT DOWN

Place IGNITION switch in OFF position.
Disconnect wire at fuel injection pump terminal.

a. If engine stops, replace IGNITION switch.

b. If engine does not stop, place fuel shut-off valve in OFF position and replace fuel injection pump (notify direct support maintenance).



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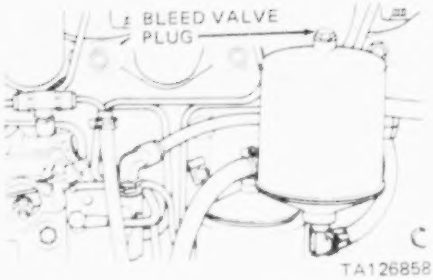
2-10. FUEL SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. LOW FUEL PRESSURE

Step 1. Check for air in fuel system.



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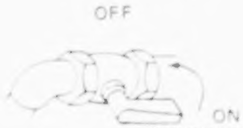
a. Place ignition switch in ON position.
Open bleed valve plug on top of secondary fuel filter allowing air to bleed out of both filters.
When fuel, free of bubbles, starts to flow, close bleed valve plug and wipe parts free of fuel.
Turn ignition switch off.

b. If no air in fuel system, proceed to step 2 below.

Step 2. Check if fuel shut-off valve is in closed position.



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a. If in closed position, place in full on position as shown.

b. If in open position, proceed to step 3 below.

Step 3. Check for leaks at fittings between fuel tank and fuel injection pump.

a. If leaks are observed, tighten or replace fittings (para 2-15d(2)).

b. If leaks are not observed, proceed to step 4 below.

Step 4. Check fuel tank strainer, in-line fuel filter, and/or lines for clogged condition (para 2-15).

a. If strainer, fuel filter and/or lines are clogged, replace the part (para 2-15).

b. If strainer, fuel filter, and lines are okay, proceed to step 5 below.

Step 5. Check for clogged fuel filters by disconnecting line between fuel filter head and fuel injection pump at fuel injection pump.
Place ignition switch in ON position and crank engine.
Fuel should be pumped out of disconnected line.

a. If fuel is not pumped out of disconnected line, reconnect fuel line and service fuel filters (para 2-15e and 2-15f).

b. If fuel is pumped out of disconnected line, reconnect fuel line and proceed to step 6 below.

Step 6. Disconnect fuel line at fuel filter head and connect to a tee fitting.
Connect a hose between other end of tee fitting and fuel filter head.
Connect pressure gage to tee fitting.
Place IGNITION switch in ON position.
Pressure gage shall indicate 4.5 to 6 PSI.

If pressure gage does not indicate 4.5 to 6 PSI, replace electric fuel pump (para 2-15b).

NOTE

If fuel injection pump is suspected to be cause of problem, perform paragraph 2-15a.

2-10. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. EXCESSIVE FUEL USAGE

Step 1. Check fuel lines for leakage or damage.

a. If fuel lines are leaking or damaged, repair or replace (para 2-15d(2)).

b. If fuel lines are okay, proceed to step 2 below.

Step 2. Check fuel tank for leakage or damage.

a. If fuel tank leaks or is damaged, notify direct support maintenance.

b. If fuel tank is okay, proceed to step 3 below.

Step 3. Check if air cleaner indicator red flag is in view.

a. If in view, depress reset button on top of indicator and check that red flag disappears from view. (If red flag does not disappear from view, replace air cleaner indicator as described in para 2-15c.) Crank engine and check if red flag is in view; if red flag is in view, service air cleaner (para 2-15c).

b. If red flag is not in view, notify direct support maintenance.

2-11. EXHAUST SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. EXCESSIVE EXHAUST NOISE

Step 1. Check muffler and exhaust pipe for cracks and holes.

a. If muffler or exhaust pipe are cracked or holes are observed, replace (para 2-16).

b. If muffler and exhaust pipe check okay, proceed to step 2 below.

Step 2. Squirt small amount of oil on muffler gasket area where muffler connects to exhaust manifold. With engine idling, check if air bubbles can be seen, indicating damaged gasket.

a. If air bubbles are seen, replace gasket (para 2-16).

b. If air bubbles are not seen, proceed to step 3 below.

Step 3. Squirt small amount of oil on exhaust manifold in gasket area where exhaust manifold is mounted to cylinder head.
With engine idling, check if air bubbles can be seen, indicating gasket is damaged.

a. If air bubbles are seen, replace gasket (para 2-14e).

b. If air bubbles are not seen, proceed to step 4 below.

Step 4. Check exhaust manifold for cracks or holes.

Replace exhaust manifold (para 2-14e).

2-11. EXHAUST SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. EXCESSIVE EXHAUST SMOKE

Check if muffler requires cleaning.

Clean (para 2-16).

NOTE

If problem is not corrected, notify direct support maintenance.

2-12. COOLING SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE OVERHEATS

Step 1. Check fan belt for proper tension.
Depress fan belt midway between fan pulley and crankshaft pulley.
Fan belt should be deflected approximately 1/2 inch.

a. If fan belt does not deflect 1/2 inch approximately, adjust it (para 2-17f).

b. If fan belt deflects 1/2 inch approximately, proceed to step 2 below.

Step 2. Inspect fan belt for damage, wear, oil covered, or riding deeply in pulley groove.

a. If any of the above conditions are observed, replace fan belt (para 2-17f).

b. If none of the above conditions are observed, proceed to step 3 below.

Step 3. With engine idling, remove radiator cap and observe coolant to see if it moves indicating water pump is operating.

a. If coolant movement is not observed, replace water pump (para 2-17e).

b. If coolant movement is observed, proceed to step 4 below.

Step 4. Check radiator and hoses for leakage or damage.

a. If radiator and/or hoses are leaking or damaged, replace (para 2-17c and 2-17b, respectively).

b. If radiator and hoses are okay, proceed to step 5 below.

Step 5. Check fan blade assembly for damage.

a. If fan blade assembly is damaged, replace (para 2-17f).

b. If fan blade assembly checks okay, proceed to step 6 below.

2-12. COOLING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE OVERHEATS (cont)

Step 6. Check thermostat (para 2-17d).

Replace thermostat (para 2-17d).

2. ENGINE DOES NOT REACH OPERATING TEMPERATURE

Check thermostat (para 2-17d).

Replace thermostat (para 2-17d).

3. COOLING SYSTEM NOT PRESSURIZED

NOTE

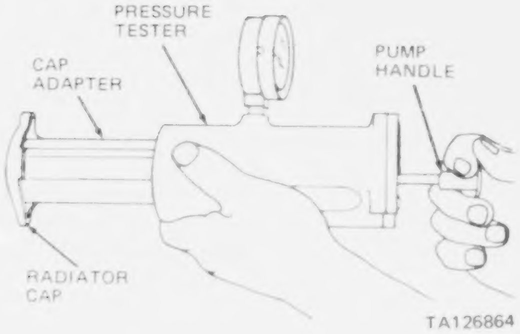
With engine at normal operating temperature, run engine at high speed for two minutes and return to idle speed. Carefully cover radiator cap with a cloth and rotate counterclockwise to first detent. A hissing noise from cap and filler neck indicates that system is pressurized.

Step 1. Allow engine to cool and remove radiator cap (para 2-17a).
Rinse radiator cap with clear water and install on cap adapter and pressure tester as shown.

NOTE

It may be necessary to reinstall radiator cap several times to ensure tight seal.

Operate pressure tester pump and observe meter reading at its highest point.
Cap release pressure should be 6 to 9 pounds, and should remain steady for at least 30 seconds.



a. If radiator cap pressure is 6 to 9 pounds, and remains steady for at least 30 seconds before dropping, proceed to step 2 below.

b. If radiator cap pressure is not 6 to 9 pounds, or if pressure drops rapidly, replace radiator cap.

Step 2. Disconnect cap adapter from pressure tester.
Attach pressure tester to radiator filler neck, with locking ears in line with entrance notches of filler neck.
Press down on tester and rotate clockwise until locking ears are stopped by stop lugs on radiator filler neck.
Clamp radiator inlet and outlet hoses, or block hose flanges.
Operate pressure tester pump until meter indicates 9 pounds pressure, and observe meter.

2-12. COOLING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. COOLING SYSTEM NOT PRESSURIZED (cont)

Step 2. (cont)

a. If pressure drops quickly, radiator has serious leakage. Replace radiator (para 2-17c).

b. If pressure holds steady for two or more minutes, radiator check is satisfactory.

c. If pressure drops slowly, radiator has seepage or slight leakage. Replace radiator (para 2-17c).

2-13. GAGES TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE OIL PRESSURE GAGE DOES NOT INDICATE CORRECT PRESSURE

Step 1. Place IGNITION switch in ON position.
Oil pressure gage should indicate zero.

a. If zero indication not obtained, proceed to step 2.

b. If zero indication obtained, proceed to step 3.

Step 2. Disconnect wire from oil pressure sender.
Oil pressure gage should indicate zero.

a. If oil pressure gage indicates 80 (full scale), repair or replace short circuited wire between oil pressure sender and oil pressure gage.

b. If oil pressure gage indicates zero, replace oil pressure sender.

c. If oil pressure gage indicates other than zero or 80 (full scale), replace oil pressure gage.

Step 3. Temporarily connect jumper wire between oil pressure gage SENDER terminal and chassis ground.
Place IGNITION switch in ON position.
Oil pressure gage should indicate 80 (full scale).

a. If 80 (full scale) indication not obtained, proceed to step 4.

b. If 80 (full scale) indication obtained, disconnect wire and proceed to step 5.

Step 4. Check for +24 Vdc between oil pressure gage IGN terminal and ground (IGNITION switch in ON position).

a. If +24 Vdc not obtained, troubleshoot electrical system (para 2-19).

b. If +24 Vdc obtained, disconnect jumper wire between oil pressure gage SENDER terminal and ground, and replace oil pressure gage (para 2-18b).

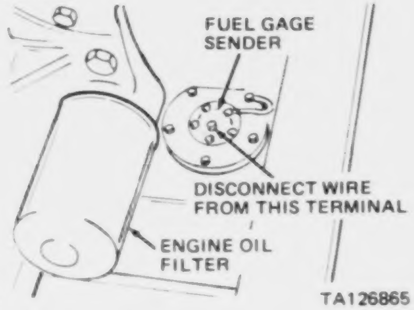
2-13. GAGES TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE OIL PRESSURE GAGE DOES NOT INDICATE CORRECT PRESSURE (cont)

Step 5. Disconnect wire from oil pressure sending unit.
Temporarily ground wire while assistant observes oil pressure gage.
Oil pressure gage shall indicate 80 (full scale).

Repair or replace broken wire (notify direct support maintenance).



2. FUEL GAGE DOES NOT REGISTER

Step 1. If fuel gage indicates E, disconnect wire at fuel gage sender and ground wire to chassis.
Place IGNITION switch in ON position.
Fuel gage should indicate F.

a. If fuel gage indicates F, replace fuel gage sender (para 2-31a).

b. If fuel gage indicates E, proceed to step 2.

c. If fuel gage indicates other than F or E, replace it (para 2-18b).

Step 2. Check for +24 Vdc at fuel gage IGN terminal (IGNITION switch in ON position).

a. If +24 Vdc not obtained, troubleshoot electrical system (para 2-19).

b. If +24 Vdc obtained, replace fuel gage (para 2-18b).

Step 3. If fuel gage indicates F, disconnect wire at fuel gage sender.
Fuel gage should indicate E (IGNITION switch ON).

a. If fuel gage indicates E, replace fuel gage sender.

b. If fuel gage indicates F, repair short circuited wire (notify direct support maintenance).

c. If fuel gage indicates other than F or E, replace it (para 2-18b).

3. FUEL GAGE DOES NOT INDICATE CORRECT FUEL LEVEL

Disconnect wire at fuel gage SENDER terminal and connect a two foot length of no. 22 AWG insulated wire to this terminal.
Obtain a 1K ohm variable resistor and connect one end to other end of wire connected to fuel gage SENDER terminal.
Connect center terminal of 1K ohm variable resistor to ground.
Place IGNITION switch in ON position
Adjust variable resistor until fuel gage indicates 1/4 E, turn IGNITION switch OFF, and measure and note resistance of variable resistor using an ohmmeter.
Turn IGNITION switch ON and repeat this procedure for 1/2 and 3/4 F fuel gage indications.

a. Replace fuel gage if resistance readings are not within 22±2, 44±4, and 66±6 ohms for 1/4 E, 1/2, and 3/4 fuel gage indications.

b. Replace fuel gage sender if resistance readings are within above values.

2-14. ENGINE MAINTENANCE

a. Flywheel.

This task covers flywheel inspection.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

None

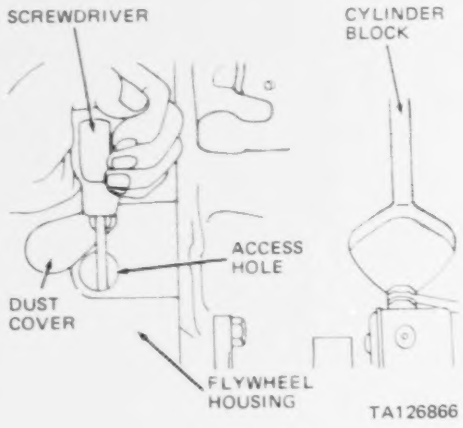
EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Flywheel housing	Dust cover	Relocate	Away from access hole
2.	Flywheel housing access hole	Ring gear	Inspect	Notify general support maintenance if gear teeth are missing or broken.

NOTE

Use screwdriver inserted in access hole and engaging ring gear teeth to crank engine to check all gear teeth.


SCREWDRIVER
CYLINDER BLOCK
ACCESS HOLE
DUST COVER
FLYWHEEL HOUSING
TA126866

3.	Flywheel housing	Dust Cover	Relocate	Over access hole

2-14. ENGINE MAINTENANCE (cont)

b. Draining and Refilling Engine Crankcase.

This task covers draining and refilling engine crankcase.

INITIAL SETUP

TOOLS

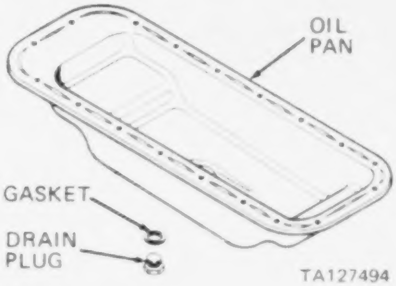
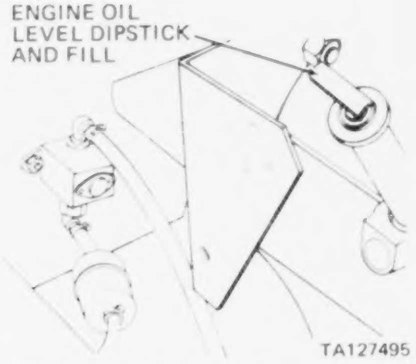
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Seven quarts engine oil (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off, oil hot from engine operation.
2-53c	Left side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Engine oil pan	Drain plug	Remove	Drain oil into two gallon container 
2	Engine oil pan	Drain plug	Install	Tighten securely
3	Engine, right side	a. Engine oil level dipstick b. Engine oil fill	Remove Fill	 With engine oil (refer to current lubrication order). Start engine, run for several minutes and then check for oil leak at drain plug

NOTE

Change engine oil filter as described in paragraph 2-14c.

2-14. ENGINE MAINTENANCE (cont)

c. *Oil Filter.*

This task covers oil filter replacement.

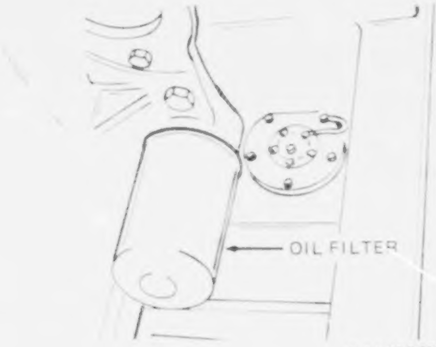
INITIAL SETUP

TOOLS
Clamping Type Oil Filter Wrench

MATERIALS/PARTS
Oil filter

EQUIPMENT CONDITION

Paragraph	Condition Description
2-14b	Engine crankcase drained.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Engine, left side, rear	Oil filter	Remove	Use filter wrench; turn counterclockwise to remove.
2	Engine, left side, rear	Oil filter	Install	Apply thin coat of clean oil to gasket of new oil filter. Install until gasket contacts base, then turn one-half to three-quarters of a turn to obtain proper seal.
		 TA126867		
3	Engine oil pan	Drain plug	Install	Tighten securely.
4	Engine, right side, rear	a. Engine oil level dipstick	Remove	
		b. Engine oil fill	Fill	With engine oil (refer to current lubrication order). Start engine and run for several minutes to charge lubrication system. Check for oil leaks at oil filter base.

2-14. ENGINE MAINTENANCE (cont)

d. Intake Manifold.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680

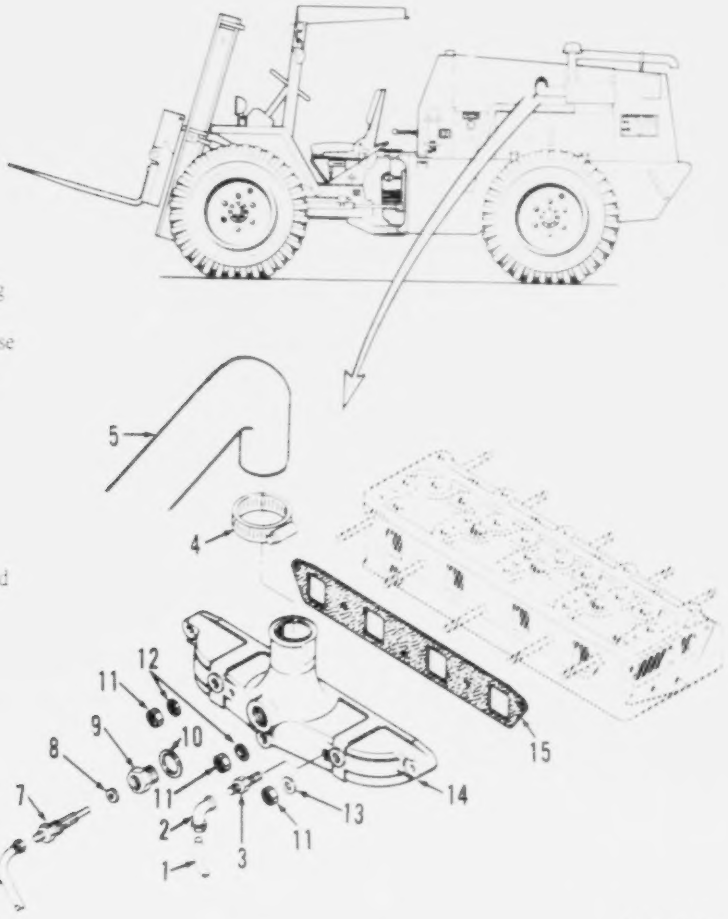
Intake manifold gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Air cleaner hose disconnected from air cleaner.
2-53c	Left side panel removed.
2-53b	Left fender removed.
2-53e	Left hood panel removed.

KEY

1. Tube
2. Elbow
3. Filtered fitting
4. Hose clamp
5. Air cleaner hose
6. Delivery tube
7. Spray nozzle
8. Washer
9. Adapter
10. Gasket
11. Nuts
12. Washers
13. Washers
14. Intake manifold
15. Gasket



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2-14. ENGINE MAINTENANCE (cont)

d. Intake Manifold (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine, left side	a. Tube (1)	Disconnect	From elbow (2)
		b. Elbow (2)	Remove	
		c. Filtered fitting (3)	Remove	
		d. Hose clamp (4)	Loosen	
		e. Air cleaner hose (5)	Disconnect and remove	Remove hose clamp (4)
		f. Delivery tube (6)	Disconnect and remove	From spray nozzle (7)
		g. Spray nozzle (7)	Disconnect and remove	
		h. Washer (8)	Remove	
		i. Adapter (9)	Remove	
		j. Gasket (10)	Remove	
		k. Five nuts (11)	Remove	Support intake manifold (14)
		l. Three washers (12)	Remove	
		m. Two washers (13)	Remove	
2	Cylinder head	a. Intake manifold (14)	Remove	
		b. Gasket (15)	Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air.

2-14. ENGINE MAINTENANCE (cont)

d. Intake Manifold (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		Intake manifold	Clean	Use wire brush; remove all rust, carbon, and oxidized material. Ensure that all traces of gasket material are removed.

CAUTION

When removing gasket (15) ensure that gasket material does not fall into cylinder head ports. Damage to engine may result from foreign material falling into ports.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		Cylinder head	Clean	Mating surface and studs with cleaning solvent P-D-680. Remove all traces of gasket material.
INSPECTION				
6		Intake manifold (14)	Inspect	Replace if cracked or damaged.
7		Adapter (9)	Inspect	Replace if internal threads damaged.
8		Cylinder head studs	Inspect	If studs are broken or have damaged threads notify direct support maintenance.
9		Air cleaner hose (5)	Inspect	Replace if cracked or worn.
10		All other parts	Inspect	Replace if cracked or worn.
INSTALLATION/REPLACEMENT				
11	Cylinder head	a. Gasket (15) b. Intake manifold (14)	Install Position	

2-14. ENGINE MAINTENANCE (cont)

d. Intake Manifold (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
12	Intake manifold	a. Two washers (13)	Position	
		b. Three washers (12)	Position	
		c. Five nuts (11)	Install	Tighten to 30-35 pounds foot torque.
		d. Gasket (10)	Install	
		e. Adapter (9)	Install	
		f. Washer (8)	Install	In intake manifold adapter (9)
		g. Spray nozzle (7)	Install	
		h. Delivery tube (6)	Connect	To spray nozzle (7)
		i. Hose clamp (4)	Position	On air cleaner hose (5)
		j. Air cleaner hose (5)	Connect	Tighten hose clamp (4)
		k. Filtered fitting (3)	Install	
		l. Elbow (2)	Install	In filtered fitting (3)
		m. Tube (1)	Connect	To elbow fitting (2)

2-14. ENGINE MAINTENANCE (cont)

e. Exhaust Manifold.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS

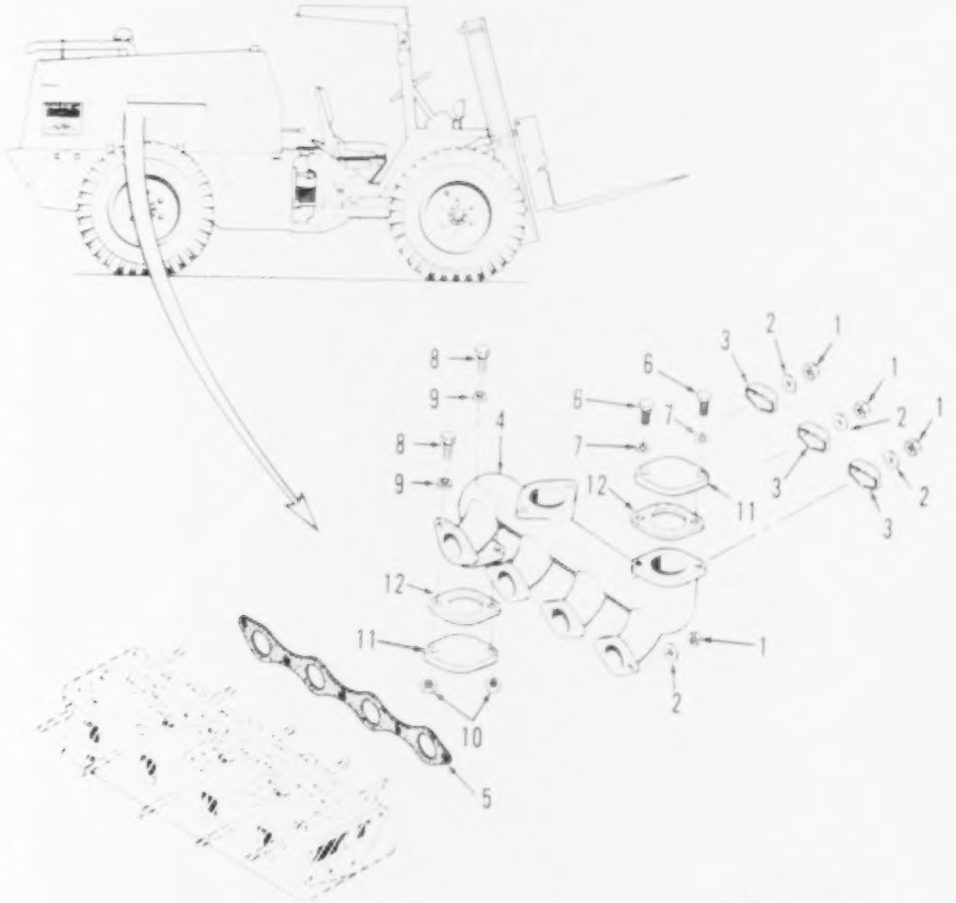
No. 1 Common Organizational Maintenance Tool Kit. NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Exhaust manifold gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Right side panel removed.
2-53b	Right fender removed.
2-53e	Left hood panel removed.
2-16	Spark arresting muffler removed.



KEY

1. Nuts
2. Washers
3. Clamps
4. Exhaust manifold
5. Gasket
6. Cap screws
7. Washers
8. Cap screws
9. Washers
10. Nuts
11. Outlet cover plates
12. Gaskets

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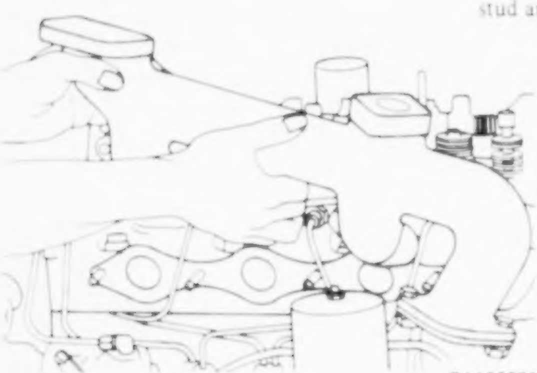
2-14. ENGINE MAINTENANCE (cont)

e. Exhaust Manifold (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine, left side	a. Five nuts (1) b. Five washers (2) c. Three clamps (3)	Remove Remove Remove	
2	Cylinder head	a. Exhaust manifold (4)	Remove	Pull front of exhaust manifold from front cylinder head stud, swing manifold upward and pull off of rear cylinder head stud and away from engine as shown.
		 TA126870		
		b. Gasket (5)	Remove and discard	
DISASSEMBLY				
3	Exhaust manifold (4)	a. Four cap screws (6, 8) b. Four washers (7, 9) c. Two nuts (10) d. Two outlet cover plates (11) e. Two gaskets (12)	Remove Remove Remove Remove Remove	 Discard
CLEANING				
4		Exhaust manifold (4)	Clean	Use wire brush. Remove all rust, carbon, oxidized material, and gasket material.

2-14. ENGINE MAINTENANCE (cont)

e. *Exhaust Manifold (cont).*

CLEANING (cont)

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
6		Cylinder head	Clean	Mating surface and studs with cleaning solvent P-D-680. Ensure that all traces of gasket material removed.
INSPECTION				
7		Exhaust manifold (4)	Inspect	Replace if cracked, or damaged or if threads damaged
8		All other parts	Inspect	Replace if cracked, damaged or worn or if threads damaged
REASSEMBLY				
9	Exhaust manifold	a. Two gaskets (12)	Install	
		b. Two outlet cover plates (11)	Install	
		c. Two nuts (10)	Position	
		d. Four washers (9, 7)	Position	On four cap screws (8, 6)
		e. Four cap screws (8, 6)	Install	

2-14. ENGINE MAINTENANCE (cont)

e. Exhaust Manifold (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
10	Cylinder head	a. Gasket (5)	Install	
		b. Exhaust manifold (4)	Install	Hold front of manifold in raised position and install rear of manifold on rear cylinder head stud. Lower front of manifold and install on cylinder head front stud
11	Exhaust manifold	a. Three manifold clamps (3)	Install	
		b. Five washers (2)	Install	
		c. Five nuts (1)	Install	Tighten to 25-30 pounds foot

2-15. FUEL SYSTEM MAINTENANCE

a. *Fuel Injection Pump.*

This task covers testing of the fuel injection pump.

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

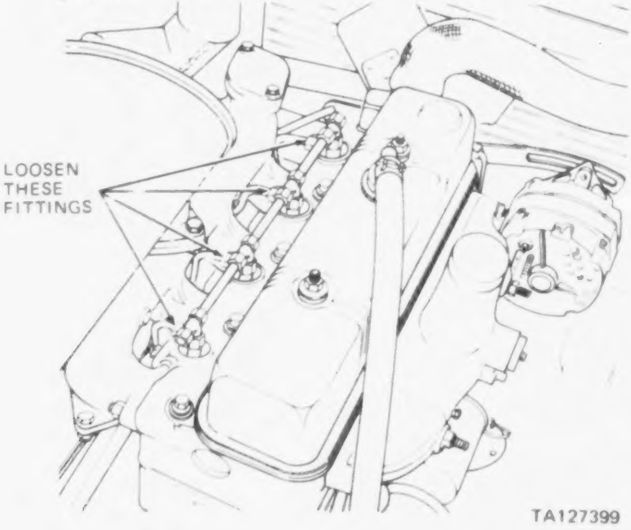
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
None

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, transmission direction selector in N (neutral) position, and parking brake applied.
2-53c	Right side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Engine compartment	Fuel injector nozzle fittings	Loosen	
2	Operator's compartment	a. IGNITION switch	Place in ON position	
		b. START switch	Depress	While engine is cranking, check that fuel is pumped out of fuel injection nozzle fittings loosened in step 1 above
		c. IGNITION switch	Place in OFF position	
3	Engine compartment	Fuel injector nozzle fittings	Tighten	Wipe any fuel from engine using clean cloth

2-15. FUEL SYSTEM MAINTENANCE (cont)

b. Electric Fuel Pump and Lines.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Testing

PERSONNEL REQUIRED
Two maintenance technicians

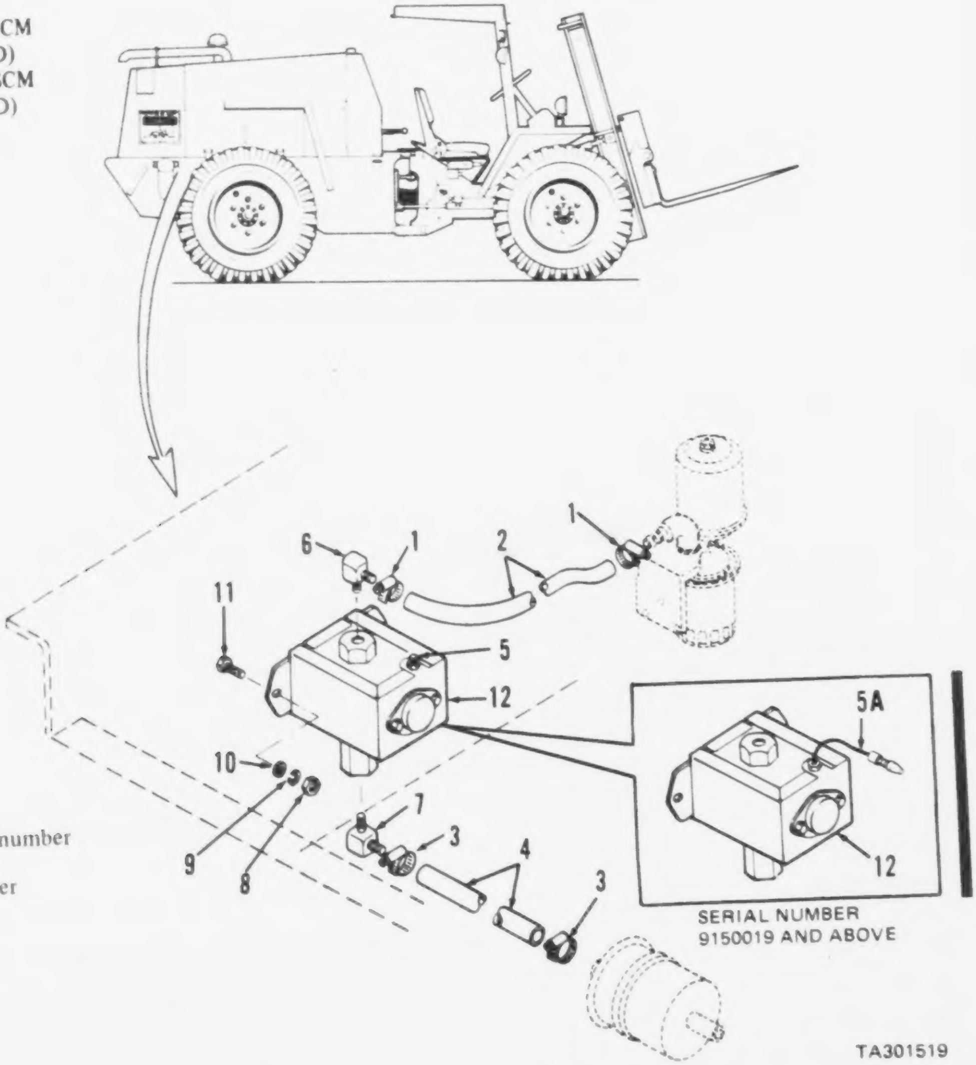
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Hose, 31 ±0.2 inches long (FSCM 81343, P/N SAE30R1-1-4ID)
Hose, 3 ±0.12 inches long (FSCM 81343, P/N SAE30R3-1-4ID)
Cleaning solvent P-D-680

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Right side panel removed.



KEY

1. Hose clamps
2. Filter supply hose
3. Hose clamps
4. Fuel filter hose
5. Screw terminal (serial number 9150018 and below)
5A. Wire lead (serial number 9150019 and above)
6. Hose barb
7. Hose barb
8. Nuts
9. Lock washers
10. Washers
11. Cap screws
12. Electric fuel pump

2-15. FUEL SYSTEM MAINTENANCE (cont)

b. Electric Fuel Pump and Lines (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, right rear	a. Screw terminal (5)	Loosen	Disconnect wire (serial number 9150018 and below)
		aa. Wire lead (5A)	Disconnect	From wiring harness lead (serial number 9150019 and above)
		b. Two hose clamps (1)	Loosen	
		c. Filter supply hose (2)	Disconnect	Remove hose clamp (1)
		d. Two hose clamps (3)	Loosen	
		e. Fuel filter hose (4)	Disconnect	Remove hose clamp (3)
		f. Two hose barbs (6 and 7)	Remove	
		g. Two nuts (8), lock washers (9), washers (10) and cap screws (11)	Remove	
		h. Electric fuel pump (12)	Remove	
CLEANING				
2		Filter supply hose (2) and fuel filter hose (4)	Clean	Use clean diesel fuel
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		All other parts	Clean	Use cleaning solvent P-D-680; dry thoroughly.
INSPECTION				
4		Hose clamps (1 and 3)	Inspect	Replace if damaged
5		Filter supply hose (2) and fuel filter hose (4)	Inspect	Replace if cracked or split

2-15. FUEL SYSTEM MAINTENANCE (cont)

b. Electric Fuel Pump and Lines (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
6		Hose barbs (6 and 7)	Inspect	Replace if cracked or threads damaged
7		All other parts	Inspect	Replace if threads damaged
INSTALLATION/REPLACEMENT				
8	Engine compartment, right rear	a. Electric fuel pump (12)	Position	
		b. Two cap screws (11)	Position	
		c. Two washers (10), lock washers (9) and nuts (8)	Position and install	Tighten two nuts (8) securely
		d. Two hose barbs (6 and 7)	Install	
		e. Two hose clamps (3)	Position	On hose (4)
		f. Fuel filter hose (4)	Connect	If necessary, make from bulk hose (FSCM 81343, P/N SAE30R3-1-4ID); cut to 3 ±0.12 inches long. Tighten two hose clamps (3)
		g. Two hose clamps (1)	Position	On hose (2)
		h. Filter supply hose (2)	Connect	If necessary, make from bulk hose (FSCM 81343, P/N SAE30R1-1-4ID); cut to 31 + 0.2 inches long. Tighten two hose clamps (1).
		i. Screw terminal (5)	Connect wire and tighten	Serial number 9150018 and below
		j. Wire lead (5A)	Connect to wiring harness	Serial number 9150019 and over
				Place ignition switch in ON position and open bleed valve on top of secondary fuel filter allowing air to bleed out of both filters. When fuel, free of bubbles starts to flow, close bleed valve and wipe parts free of fuel. Turn ignition switch off.
TESTING				
9	Engine compartment, right rear	a. Hose clamp (1)	Loosen	At fuel filter head
		b. Filter supply hose (2)	Disconnect	At fuel filter head; place end of hose into a gallon container
10	Operator's compartment	Ignition switch	Place in ON position	
11	Engine compartment	a. Electric fuel pump	Listen for slight buzz	
		b. Gallon container	Observe hose (2)	Fuel should be pumped out of hose (2) into container

2-15. FUEL SYSTEM MAINTENANCE (cont)

b. Electric Fuel Pump and Lines (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
12	Operator's compartment	Ignition switch	Place in OFF position	
13	Engine compartment	Filter supply hose (2)	Remove from container	Install tee fitting in disconnected end of hose. Connect hose between tee fitting and fuel filter head. Connect pressure gage to tee fitting
14	Operator's compartment	Ignition switch	Place in ON position	
15	Engine compartment	a. Pressure gage	Read	Gage should indicate 4.5 to 6 PSI; turn ignition switch OFF; disconnect test set-up
		b. Filter supply hose (2)	Connect	To fuel filter head
		c. Hose clamp (1)	Position and tighten	

NOTE

If fuel is not pumped out of electric fuel pump in step 11 above or if pressure indication obtained in step 15 is not 4.5 to 6 PSI, replace electric fuel pump.

2-15. FUEL SYSTEM MAINTENANCE (cont)

c. *Air Cleaner.*

This task covers:
a. Removal
b. Disassembly
c. Cleaning/Servicing
d. Inspection
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS

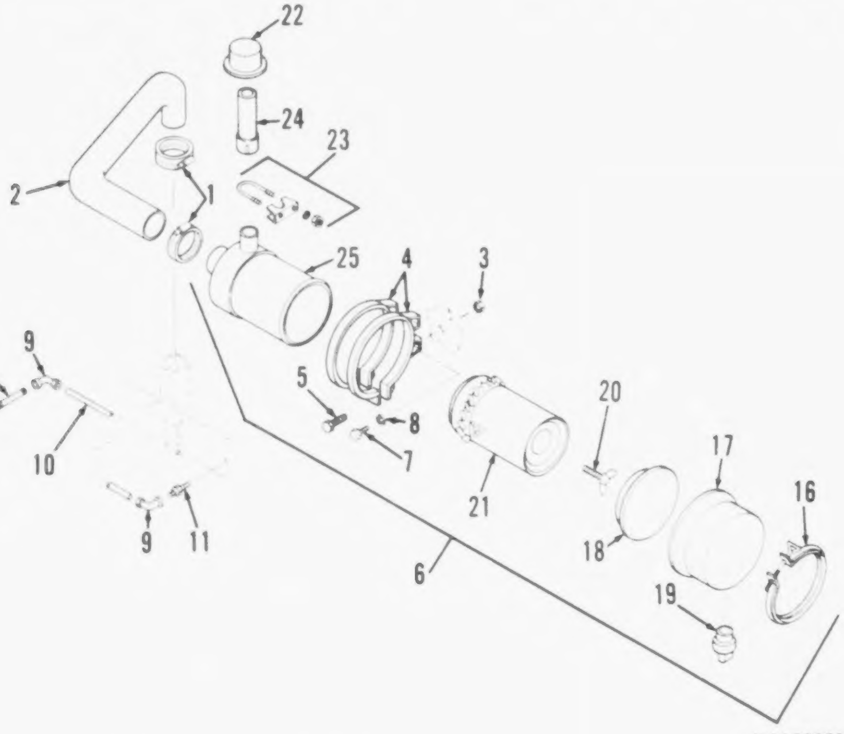
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Warm water
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.
2-53f	Front cover panel removed.



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KEY

1. Hose clamps
2. Hose
3. Nuts
4. Mounting clamps
5. Screws
6. Air cleaner assembly
7. Cap screws
8. Lock washers
9. Elbows
10. Tube
11. Filtered fitting
12. Pipe nipple
13. Nut
14. Indicator
15. Elbow
16. Clamp
17. Dust cap
18. Baffle
19. Evaluator
20. Wing nut
21. Filter element
22. Cap
23. Clamp
24. Tube
25. Body

2-15. FUEL SYSTEM MAINTENANCE (cont)

c. Air Cleaner (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Air cleaner assembly (6)	a. Two hose clamps (1)	Loosen	
		b. Hose (2)	Disconnect and remove	
		c. Two hose clamps (1)	Remove	
2	Left hood panel	a. Four nuts (3)	Remove	Reach inside, behind hood panel
		b. Two mounting clamps (4)	Remove	Air cleaner assembly (6), four cap screws (7), two screws (5) and four lock washers (8) will be removed with mounting clamp
3	Mounting clamp (4)	a. Two screws (5)	Remove	
		b. Air cleaner assembly (6)	Remove	
		c. Four cap screws (7)	Remove	
		d. Four lock washers (8)	Remove	
4	Left hood panel	a. Elbows (9)	Loosen nut	Reach inside engine compartment, behind hood panel
		b. Tube (10)	Remove	
		c. Two elbows (9)	Remove	
		d. Filtered fitting (11)	Remove	From intake manifold
		e. Pipe nipple (12)	Remove	Support indicator
		f. Nut (13)	Remove	
		g. Indicator (14)	Remove	
		h. Elbow (15)	Remove	
DISASSEMBLY				
5	Air cleaner assembly (6)	a. Clamp (16)	Loosen	
		b. Dust cup (17)	Remove	
6	Dust cup (17)	a. Baffle (18)	Remove	
		b. Evaluator (19)	Remove	
7	Body (25)	a. Wing nut (20)	Remove	
		b. Filter element (21)	Remove	
		c. Cap (22)	Remove	
		d. Clamp (23)	Remove	
		e. Tube (24)	Remove	

2-15. FUEL SYSTEM MAINTENANCE (cont)

c. Air Cleaner (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING/SERVICING				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
8		Filter element (21)	Clean and wash	Use compressed air directed inside element
9		Baffle (18) and evaluator (19)	Clean	Rinse with water. Dry thoroughly with compressed air
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amount of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
10		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
11		Filter element (21)	Inspect	Place light inside filter element. Replace element if clogged, damaged, torn, has holes or if gasket on end of element is damaged
12		All other parts	Inspect	Replace if damaged, cracked, dented, worn, distorted or clogged
REASSEMBLY				
13	Tube (24)	Cap (22)	Install	
14	Body (25)	a. Tube (24) b. Clamp (23) c. Filter element (21)	Install Install Install	 Insert open end first

2-15. FUEL SYSTEM MAINTENANCE (cont)

c. Air Cleaner (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
14 (cont)		d. Wing nut (20)	Install and tighten	
15	Dust cup (17)	a. Evaluator (19)	Install	
		b. Baffle (18)	Install	
16	Body (25)	a. Dust cup (17)	Position	
		b. Clamp (16)	Tighten	
INSTALLATION/REPLACEMENT				
17	Left hood panel	a. Elbow (15)	Install	On indicator (14)
		b. Indicator (14)	Install	
		c. Nut (13)	Install	On pipe nipple (12)
		d. Pipe nipple (12)	Install	
		e. Filtered fitting (11)	Install	On intake manifold
		f. Two elbows (9)	Install	On filtered fitting (11) and pipe nipple (12)
		g. Tube (10)	Install	
		h. Two elbows (9)	Tighten nut	To secure tube (10)
18	Mounting clamp (4)	a. Four lock washers (8)	Install	On four cap screws (7)
		b. Four cap screws (7)	Position	
		c. Air cleaner assembly (6)	Position	
		d. Two screws (5)	Install	
19	Left hood panel	a. Two mounting clamps (4)	Position	
		b. Four nuts (3)	Install	
20	Air cleaner assembly (6)	a. Two hose clamps (1)	Position	On hose (2)
		b. Hose (2)	Connect	
		c. Two hose clamps (1)	Tighten	

2-15. FUEL SYSTEM MAINTENANCE (cont)

d. Fuel Tank, Lines and Fittings.

(1) Fuel Tank.

This task covers draining, cleaning, inspection, and filling (servicing).

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

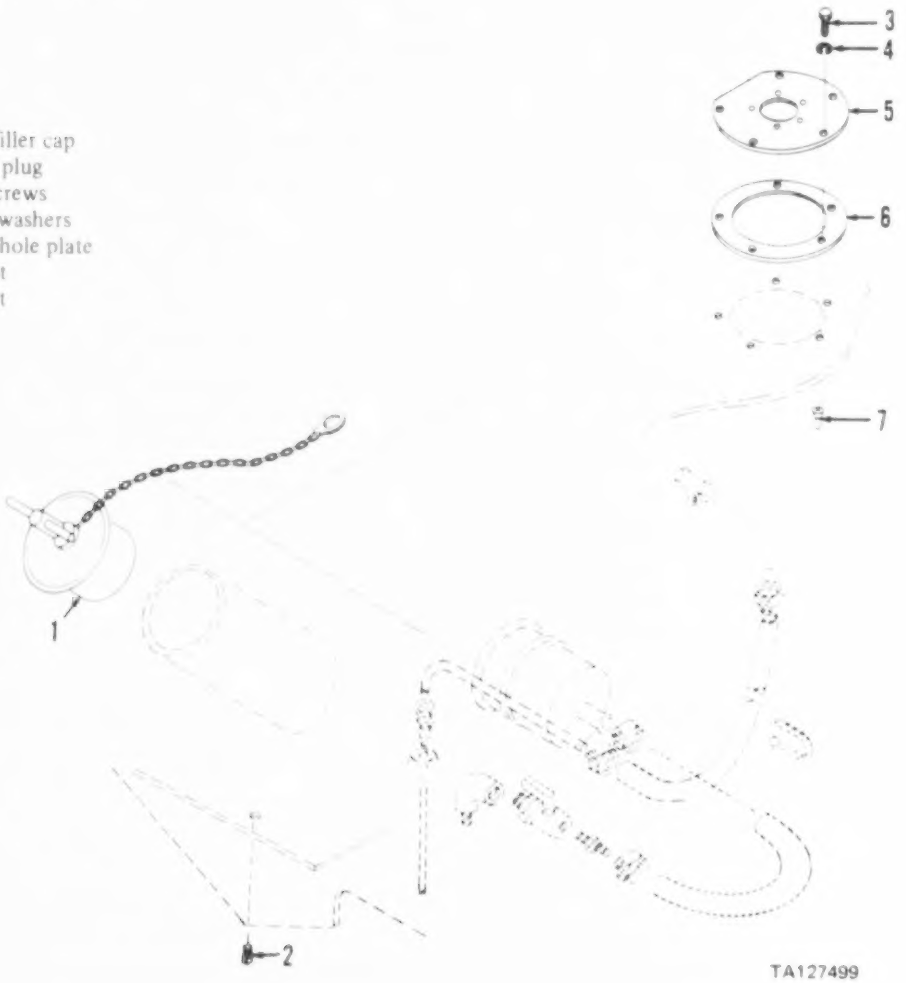
Cleaning solvent P-D-680
Clean cloths
Gasket
Tie strap
Container, 30 gallon capacity

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.
2-31a	Fuel gage sending unit removed.

KEY

1. Fuel filler cap
2. Drain plug
3. Cap screws
4. Lock washers
5. Hand hole plate
6. Gasket
7. Rivnut



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2-15. FUEL SYSTEM MAINTENANCE (cont)

d. Fuel Tank, Lines and Fittings (cont)

(1) Fuel Tank (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DRAINING				
1	Right rear of vehicle	Fuel filler cap (1)	Remove	
		WARNING Diesel fuel is highly combustible. When performing the following step, do not smoke or allow open flames or sparks into the area. Death or severe injury may result if personnel fail to observe this precaution. If you are burned, obtain medical attention immediately.		
2	Fuel tank, bottom, middle	a. Container	Position	Under drain plug
		b. Drain plug (2)	Remove	Drain fuel into 30 gallon container
3	Fuel tank, top right	a. Five cap screws (3) and lock washers (4)	Remove	
		b. Hand hole plate (5)	Remove	
		c. Gasket (6)	Remove	Discard
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		Fuel tank, interior	Clean	Use clean cloth moistened with cleaning solvent P-D-680. Dry thoroughly.
5		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly.
INSPECTION				
6		All parts	Inspect	Replace if cracked, bent, or if threads damaged.

2-15. FUEL SYSTEM MAINTENANCE (cont)

d. *Fuel Tank, Lines and Fittings (cont).*

(1) Fuel Tank (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
FILLING				
7	Fuel tank, top left	a. Gasket (6)	Position	In fuel tank
		b. Hand hole plate (5)	Install	
		c. Five cap screws (3) and lock washers (4)	Install	Be sure to attach fuel gage sending unit ground wire
8	Fuel tank, bottom middle	Drain plug (2)	Install	
9	Right rear of vehicle	a. Fuel filler tube	Fill	With fuel (refer to current lubrication order)
		b. Fuel filler cap (1)	Install	

2-15. FUEL SYSTEM MAINTENANCE (cont)

d. Fuel Tank, Lines and Fittings (cont)

(2) Lines and Fittings.

This task covers: a. Removal
b. Cleaning
c. Inspection
d. Installation

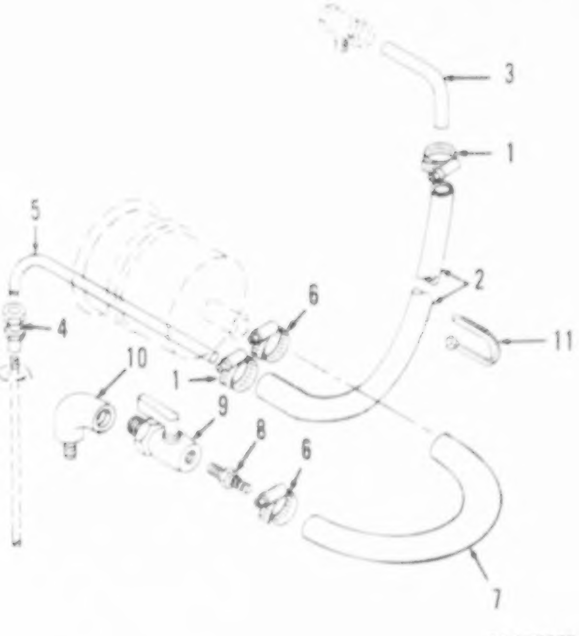
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Hose, 31 ±0.2 inches long (FSCM 81343 P/N SAE 30R3-1-4ID)
Hose, 10 ±1/4 inches long (FSCM 81343 P/N SAE30R3-1-4ID)
Tie strap

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Right side panel removed.



KEY

1. Hose clamps
2. Fuel return hose
3. Fuel return tube
4. Compression fitting
5. Tube
6. Hose clamps
7. Fuel filter hose
8. Hose barb
9. Fuel shut-off valve
10. Elbow
11. Tie strap

2-15. FUEL SYSTEM MAINTENANCE (cont)

d. Fuel Tank, Lines and Fittings (cont).

(2) Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, right side	a. Two hose clamps (1)	Loosen	
		b. Fuel return hose (2)	Remove	Cut tie strap (11) and discard
		c. Two hose clamps (1)	Remove	
		d. Fuel return tube (3)	Remove	Loosen nut on compression fitting located on fuel injection pump to remove
		e. Compression fitting (4)	Loosen nut	
		f. Tube (5)	Remove	
		g. Compression fitting (4)	Remove	
		h. Two hose clamps (6)	Loosen	
		i. Fuel filter hose (7)	Remove	
		j. Two hose clamps (6)	Remove	
		k. Hose barb (8)	Remove	
		l. Fuel shut-off valve (9)	Remove	
		m. Elbow (10)	Remove	
CLEANING				
2		Hoses (2 and 7)	Clean	Use clean diesel fuel; dry thoroughly

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		All other parts	Clean	Use cleaning solvent P-D-680; dry thoroughly

2-15. FUEL SYSTEM MAINTENANCE (cont)

d. Fuel Tank, Lines and Fittings (cont).

(2) Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Hoses (2 and 7)	Inspect	Replace if cracked, split, or holes are apparent. Check inside diameter for blockage; remove blockage or replace hose
5		Tubes (3 and 5)	Inspect	Replace if cracked or dented. Replace if inside diameter is blocked with dirt or foreign matter
6		All other parts	Inspect	Replace if damaged or cracked, or if threads are damaged
INSTALLATION				
7	Engine compartment, right side	a. Elbow (10)	Install	
		b. Fuel shut-off valve (9)	Install	
		c. Hose barb (8)	Install	
		d. Fuel filter hose (7)	Install	If necessary, make hose (7) from bulk hose (FSCM 81343, P/N SAE30R3-1-4ID); cut to 10 ±1/4 inches long
		e. Two hose clamps (6)	Install and tighten	
		f. Compression fitting (4)	Install	
		g. Tube (5)	Install and tighten nut	In compression fitting
		h. Fuel return tube (3)	Install	In compression fitting on fuel injector pump; tighten nut on compression fitting
		i. Fuel return hose (2)	Install	If necessary, make hose (2) from bulk hose (FSCM 81343, P/N SAE30R1-1-4ID); cut to 31 ±0.2 inches long
		j. Two hose clamps (1)	Install and tighten	
		k. Tie strap (11)	Install	Secures fuel injection pump wire to hose (2)

2-15. FUEL SYSTEM MAINTENANCE (cont)

e. In-Line Fuel Filter.

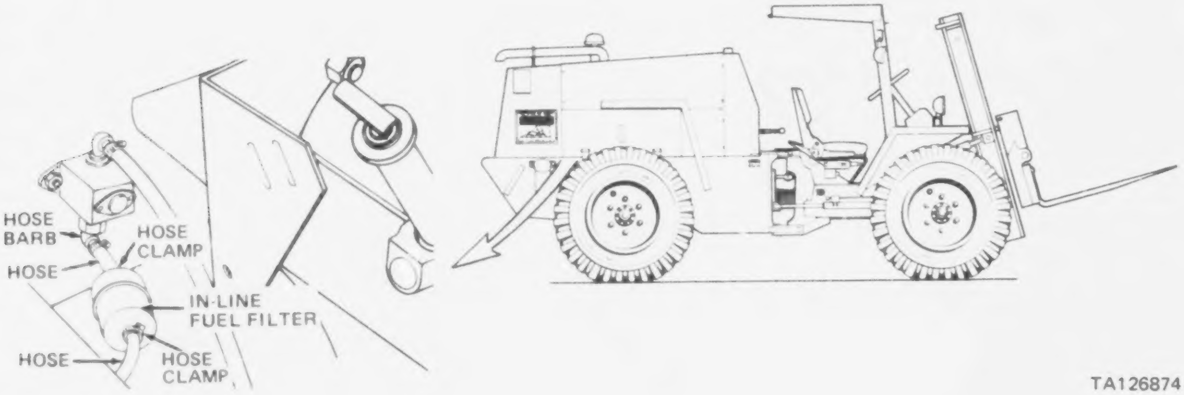
This task covers removal/servicing and replacement.

INITIAL SETUP

TOOLS		
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654	

EQUIPMENT CONDITION Paragraph	Condition Description
	Engine off.
2-53c	Right side panel removed.

MATERIALS/PARTS
In-line fuel filter



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STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL/SERVICING				
1	Engine compartment, right rear	a. Two hose clamps	Loosen	
		b. Two hoses	Disconnect	
		c. In-line fuel filter	Discard	
REPLACEMENT				
2	Engine compartment, right rear	a. Two hoses	Connect	To in-line fuel filter; if necessary, reposition hose barb
		b. Two hose clamps	Install and tighten	
		c. Fuel filter assembly	Bleed air from system	Para 2-15f, step 5

2-15. FUEL SYSTEM MAINTENANCE (cont)

f. Fuel Filter Assembly.

This task covers:
- a. Removal/Servicing
- b. Cleaning
- c. Inspection
- d. Installation
- e. Bleeding air
- f. Draining moisture

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Clamping Type Oil Filter Wrench

EQUIPMENT CONDITION

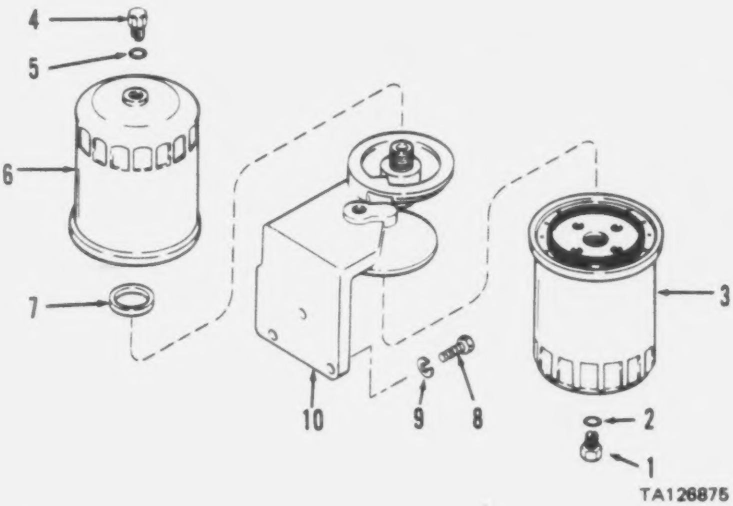
Paragraph	Condition Description
	Engine off.
2-53c	Right side panel removed.
	Fuel tank shut-off valve closed.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Fuel filter kit
Container, 1 gallon capacity

KEY

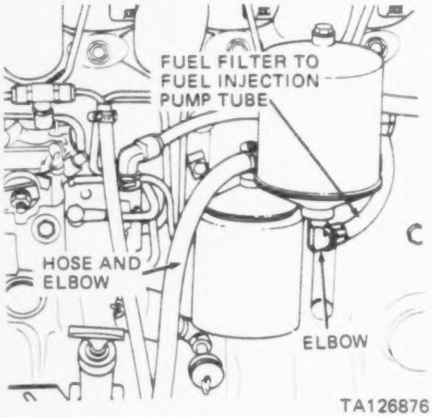
1. Drain plug
2. O-ring
3. Primary filter
4. Bleed valve plug
5. O-ring
6. Secondary filter
7. Stud gasket
8. Cap screws
9. Lock washers
10. Filter head



STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL/SERVICING				
1	Engine compartment, right side	a. Drain plug (1)	Remove	Place container under drain plug to drain fuel into
		b. O-ring (2)	Remove and discard	
		c. Primary filter (3)	Remove and discard	Use filter wrench
		d. Bleed valve plug (4)	Remove	
		e. O-ring (5)	Remove and discard	

2-15. FUEL SYSTEM MAINTENANCE (cont)

f. Fuel Filter Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL/SERVICING (cont)				
1 (cont)		f. Secondary filter (6)	Remove and discard	
		g. Stud gasket (7)	Remove and discard	
		h. Three cap screws (8) and lock washers (9)		
		i. Hose clamp, filter supply hose, and elbow	Remove	 FUEL FILTER TO FUEL INJECTION PUMP TUBE C HOSE AND ELBOW ELBOW TA126876
		j. Fuel filter to injection pump tube	Disconnect	
		k. Elbow	Remove	
		l. Filter head (10)	Remove	
CLEANING		**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		Filter head	Clean	Use cleaning solvent P-D-680; dry thoroughly
INSPECTION				
3		Filter head	Inspect	Replace if cracked or threads damaged
INSTALLATION				
4	Engine, right side	a. Filter head (10)	Position	On engine cylinder block

2-15. FUEL SYSTEM MAINTENANCE (cont)

f. Fuel Filter Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
4 (cont)		b. Elbow	Install	In bottom hole of filter head
		c. Fuel filter to fuel injection pump tube	Connect	To elbow
		d. Elbow, filter supply hose, and hose clamp	Install	
		e. Three lock washers (9) and cap screws (8)	Install	
		f. Stud gasket (7)	Position	On filter head stud
		g. Secondary filter (6)	Apply clean oil to gasket then install	Tighten filter until gasket contacts filter head then tighten 1/2 turn. Loosen filter and retighten 1/2 to 3/4 turn to obtain proper seal
		h. Primary filter (3)	Apply clean oil to gasket then install	Tighten filter until gasket contacts filter head then tighten 1/2 turn. Loosen filter and retighten 1/2 to 3/4 turn to obtain proper seal
		i. O-ring (5)	Install	On bleed valve plug (4)
		j. Bleed valve plug (4)	Install	In secondary filter (6)
		k. O-ring (2)	Install	On drain plug (1)
		l. Drain plug (1)	Install	In primary filter (3)
		m. Fuel tank shutoff valve	Open	
BLEEDING AIR				
5	Secondary filter (6)	Bleed valve plug (4)	Loosen	Place ignition switch in ON position and allow air to bleed out of both filters. When fuel, free of bubbles, starts to flow, close bleed valve plug and wipe parts free of fuel. Place ignition switch in OFF position
DRAINING MOISTURE				
6	Primary filter (3)	Drain plug (1)	Loosen	Allow fuel to drain until free of water. Bleed air from filters as described above.

2-15. FUEL SYSTEM MAINTENANCE (cont)

g. *Fuel Strainer.*

This task covers:
a. Removal/Servicing
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

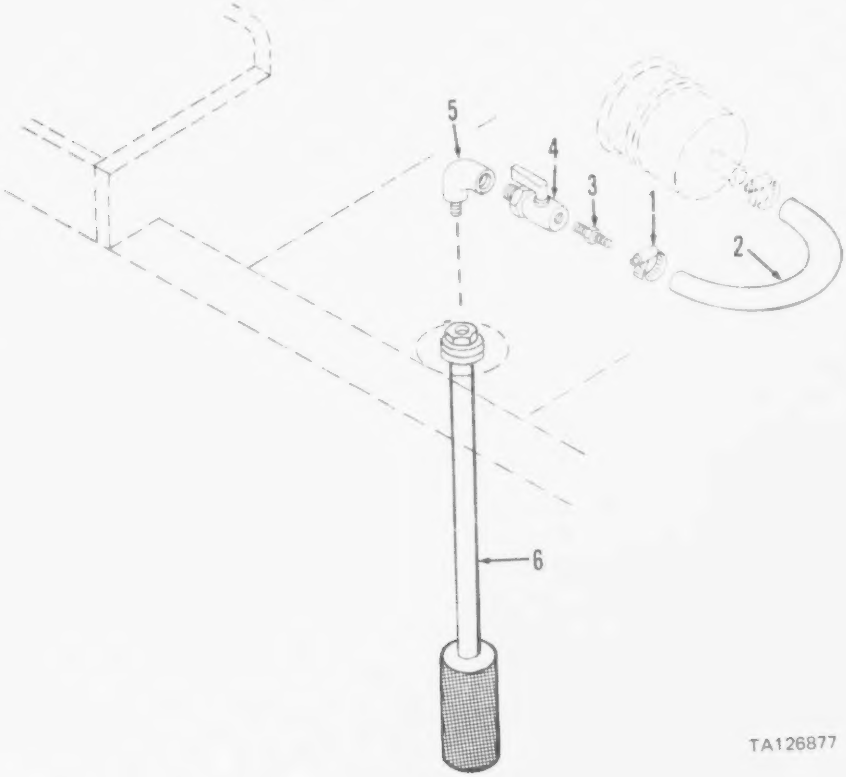
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Right side panel removed.
	Fuel shut-off valve closed.

KEY

1. Hose clamp
2. Fuel filter hose
3. Hose barb
4. Fuel shut-off valve
5. Elbow
6. Fuel strainer



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2-15. FUEL SYSTEM MAINTENANCE (cont)

g. Fuel Strainer (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL/SERVICING				
1	Engine compartment, left side	a. Hose clamp (1)	Remove	
		b. Fuel filter hose (2)	Disconnect and cap	From hose barb (3)
		c. Hose barb (3)	Remove	
		d. Fuel shut-off valve (4)	Remove	
		e. Elbow (5)	Remove	
		f. Fuel strainer (6)	Remove	From fuel tank
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2		Fuel shut-off valve (4) and fuel strainer (6)	Clean	Use cleaning solvent P-D-680. Immerse and move slowly up and down until all foreign material is dissolved. Dry thoroughly with compressed air
3		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly

2-15. FUEL SYSTEM MAINTENANCE (cont)

g. Fuel Strainer (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Fuel strainer (6)	Inspect	Replace if damaged, cracked, distorted, damaged or missing threads, or if screen is torn or deformed
5		Fuel shut-off valve (4)	Inspect	Replace if damaged, cracked, bent, distorted, missing or damaged threads or if lever rotation is difficult
6		All other parts	Inspect	Replace if damaged, cracked, worn or distorted
INSTALLATION/REPLACEMENT				
7	Engine compartment, left side	a. Fuel strainer (6) b. Elbow (5) c. Fuel shut-off valve (4) d. Hose barb (3) e. Fuel filler hose (2) f. Hose clamp (1)	Install Install Install Install Uncap and connect Install	In fuel tank

2-15. FUEL SYSTEM MAINTENANCE (cont)

h. Quick Start Kit.

This task covers:
a. Removal
b. Disassembly/Repair
c. Cleaning
d. Inspection
e. Reassembly
f. Installation/Replacement

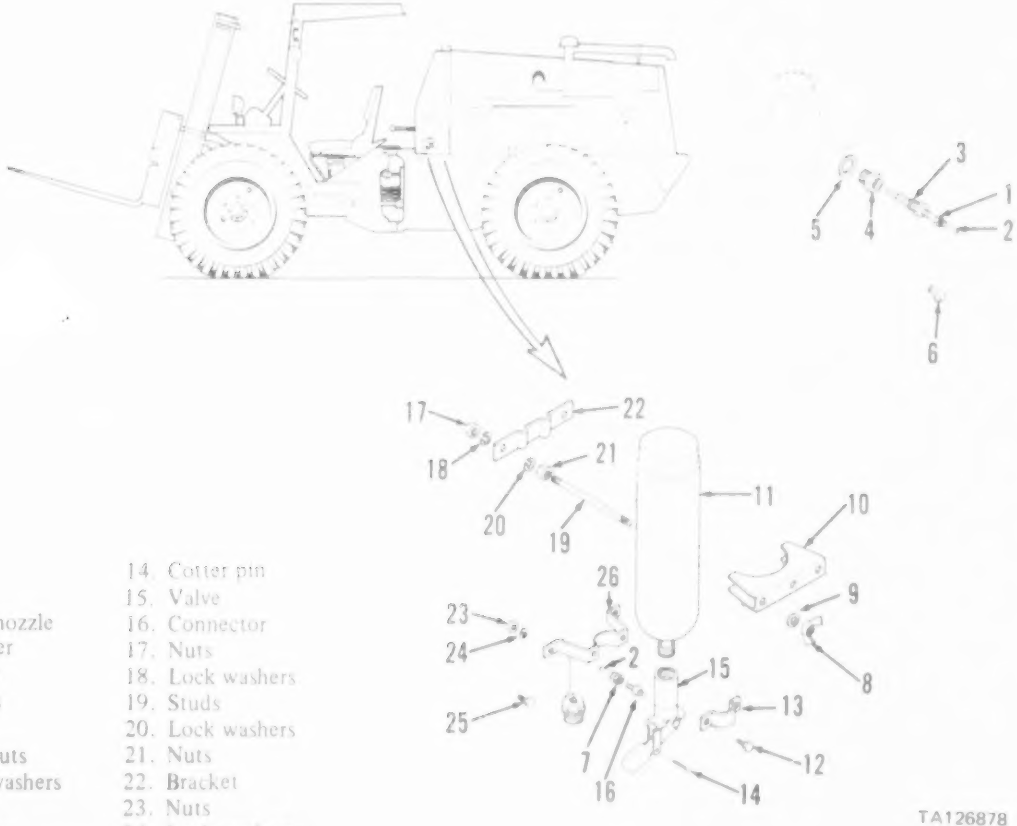
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Quick start kit

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53e	Left side panel removed
2-53f	Front cover panel removed.



KEY

1. Nut
2. Tube
3. Spray nozzle
4. Adapter
5. Washer
6. Clamps
7. Nut
8. Wing nuts
9. Lock washers
10. Clamp
11. Cylinder
12. Cap screws
13. Clamp
14. Cotter pin
15. Valve
16. Connector
17. Nuts
18. Lock washers
19. Studs
20. Lock washers
21. Nuts
22. Bracket
23. Nuts
24. Lock washers
25. Cap screws
26. Mounting bracket

2-15. FUEL SYSTEM MAINTENANCE (cont)

h. Quick Start Kit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL/DISASSEMBLY/REPAIR				
1	Engine compartment, intake manifold	a. Nut (1) b. Tube (2) c. Spray nozzle (3) d. Adapter (4) e. Washer (5)	Loosen Disconnect Remove Remove Remove	
2	Engine compartment	Two clamps (6)	Remove	
3	Quick start kit	a. Nut (7) b. Tube (2) c. Two wing nuts (8) and lock washers (9) d. Clamp (10) e. Cylinder (11)	Loosen Remove Remove Remove Unscrew and remove	

WARNING

Cylinder (11) contains starting fluid which is highly flammable and under pressure. Do not puncture cylinder (11) or discard in an open fire. Failure to follow this precaution could cause severe injury.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Two cap screws (12)	Remove	
		g. Clamp (13)	Remove	
		h. Cotter pin (14)	Remove	
		i. Valve (15)	Remove	
		j. Connector (16)	Unscrew and remove	
		k. Two nuts (17) and lock washers (18)	Remove	
		l. Two studs (19)	Remove	
		m. Two lock washers (20)	Remove	
		n. Two nuts (21)	Unscrew and remove from stud	
		o. Bracket (22)	Remove	
		p. Two nuts (23), lock washers (24) and cap screws (25)	Remove	
		q. Mounting bracket (26)	Remove	

2-15. FUEL SYSTEM MAINTENANCE (cont)

h. Quick Start Kit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All parts	Clean	Use cleaning solvent P-D-680; dry thoroughly
INSPECTION				
5		Clamps (6, 10, and 13) and brackets (22 and 26)	Inspect	Replace if damaged
6		Tube (2)	Inspect	Replace if cracked or crushed
7		Spray nozzle (3), adapter (4), valve (15), and connector (16)	Inspect	Replace if cracked or threads damaged
8		Cylinder (11)	Inspect	Replace if cracked or dented
9		All other parts	Inspect	Replace if bent, cracked, or threads damaged
INSTALLATION/REASSEMBLY/REPLACEMENT				
10	Left side of vehicle	a. Mounting bracket (26)	Position	
		b. Two cap screws (25), lock washers (24) and nuts (23)	Install	
		c. Two nuts (21)	Install	On two studs (19)
		d. Two lock washers (20)	Position	On two studs (19)
		e. Bracket (22)	Position	
		f. Two lock washers (18) and nuts (17)	Install	
		g. Connector (16)	Install	On valve (15)

2-15. FUEL SYSTEM MAINTENANCE (cont)

h. Quick Start Kit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REASSEMBLY/REPLACEMENT (cont)				
10 (cont)		h. Valve (15)	Position	
		i. Clamp (13)	Position	
		j. Two cap screws (12)	Install	
		k. Cotter pin (14)	Install	
		l. Cylinder (11)	Screw into valve (15)	
		m. Clamp (10)	Position	
		n. Two lock washers (9) and wing nuts (8)	Install	
		o. Tube (2)	Connect	To connector (16)
		p. Nut (7)	Tighten	
11	Engine compartment	a. Two clamps (6)	Install	On tube (7)
		b. Washer (5) and adapter (4)	Install	In intake manifold
		c. Spray nozzle (3)	Install	In plug (4)
		d. Tube (2)	Connect	To spray nozzle
		e. Nut (1)	Tighten	

2-15. FUEL SYSTEM MAINTENANCE (cont)

i. Accelerator/Throttle Control.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Adjustment

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

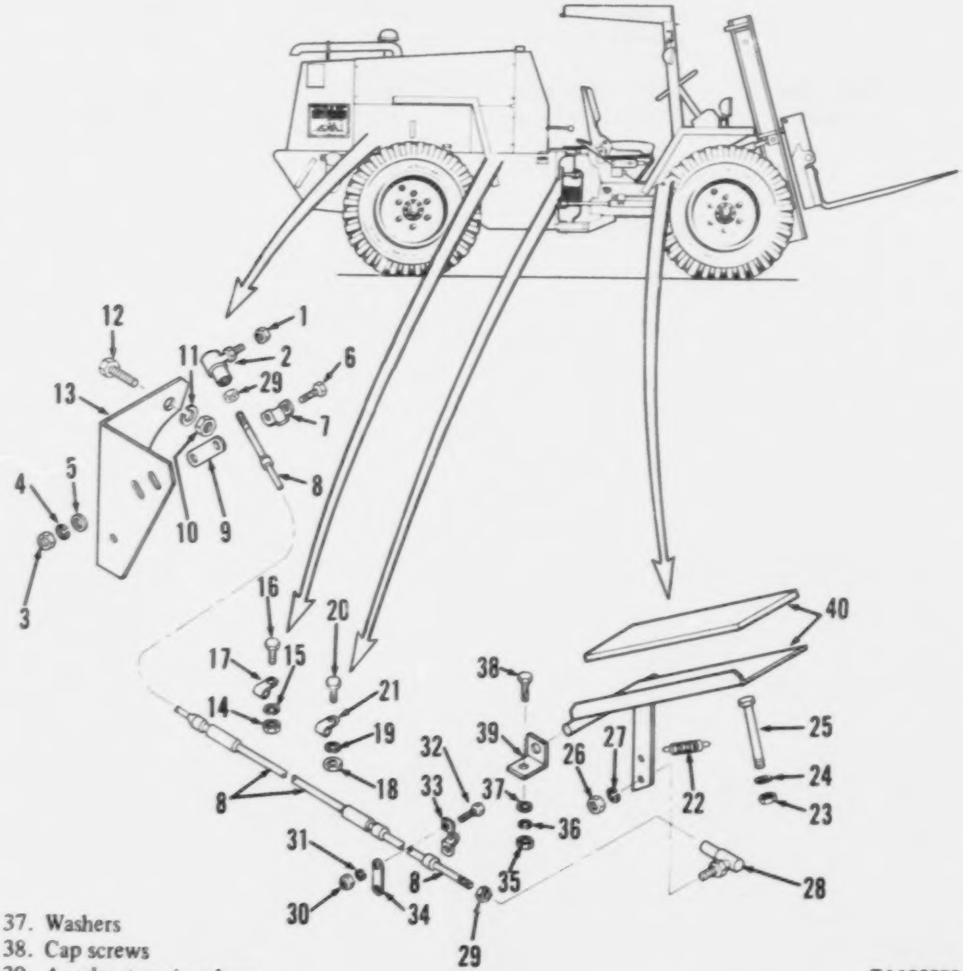
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off and parking brake applied.
2-53c	Left side panel removed.

KEY

1. Nut
2. Ball joint
3. Nuts
4. Lock washers
5. Washers
6. Cap screws
7. Clamp
8. Accelerator cable
9. Spacer
10. Nuts
11. Lock washers
12. Cap screws
13. Bracket
14. Nut
15. Lock washers
16. Cap screw
17. Clamp
18. Nut
19. Lock washer
20. Cap screw
21. Clamp
22. Throttle return spring
23. Nut
24. Washer
25. Cap screw
26. Nuts
27. Lock washer
28. Ball joint
29. Nut
30. Nuts
31. Lock washers
32. Cap screws
33. Clamp
34. Spacer
35. Nuts
36. Lock washers
37. Washers
38. Cap screws
39. Accelerator pivot bases
40. Accelerator pedal



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2-15. FUEL SYSTEM MAINTENANCE (cont)

i. Accelerator/Throttle Control (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment	a. Nut (1)	Remove	
		b. Ball joint (2)	Disconnect and remove	From fuel injection pump throttle lever
		c. Two nuts (3), lock washers (4), washers (5), and cap screws (6)	Remove	
		d. Clamp (7)	Remove	
		e. Accelerator cable (8)	Disengage	From clamp (7)
		f. Spacer (9)	Remove	
		g. Four nuts (10), lock washers (11), and cap screws (12)	Remove	
		h. Bracket (13)	Remove	
		i. Nut (14) lock washer (15), and cap screw (16)	Remove	
		j. Clamp (17)	Remove	
		k. Nut (18), lock washer (19), and cap screw (20)	Remove	
		l. Clamp (21)	Remove	
2	Front floor plate, bottom	Throttle return spring (22)	Remove	
3	Front floor plate	Nut (23), washer (24) and cap screw (25)	Remove	From front floor plate
4	Operator's compartment, bottom	a. Two nuts (26) and lock washer (27)	Remove	
		b. Ball joint (28)	Disconnect and remove	
		c. Nut (29)	Remove	
		d. Two nuts (30), lock washers (31), and cap screws (32)	Remove	
		e. Clamp (33) and spacer (34)	Remove	

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2-15. FUEL SYSTEM MAINTENANCE (cont)

i. Accelerator/Throttle Control (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
4 (cont)				

NOTE

Accelerator cable (8) can now be removed from vehicle.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Two nuts (35), lock washers (36), washers (37) and cap screws (38)	Remove	
		g. Two accelerator pivot bases (39)	Remove	
		h. Accelerator pedal (40)	Remove	
CLEANING				
5		Accelerator cable (8)	Clean	Use clean diesel fuel

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
6		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
7		Accelerator cable (8)	Inspect	Replace if cracked, split, damaged, worn or threads damaged
8		Throttle return spring (22)	Inspect	Replace if deformed or permanently set
9		All other parts	Inspect	Replace if cracked, damaged, worn or threads damaged
INSTALLATION/REPLACEMENT				
10	Operator's compartment	a. Accelerator pedal (40)	Position	

2-15. FUEL SYSTEM MAINTENANCE (cont)

i. Accelerator/Throttle Control (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
10 (cont)		b. Two accelerator pivot bases (39)	Position	One on each end of pedal (40)
		c. Two cap screws (38), washers (37), lock washers (36), and nuts (35)	Install	
		d. Clamp (33)	Position	On accelerator cable (8)
		Two cap screws (32)	Position	On clamp (33)
		f. Spacer (34)	Position and install	On two cap screws (32)
		g. Two lock washers (31) and nuts (30)	Install	
		h. Nut (29)	Install	
		i. Ball joint (28)	Install and connect	Thread onto cable (8); connect to pedal (40)
		j. Lock washer (27) and two nuts (26)	Install	
		k. Washer (24) and nut (23)	Install	On cap screw (25)
11	Front floor plate	Cap screw (25)	Install	Install so cap screw projects 1-inch from top of plate
12	Front floor plate, bottom	Throttle return spring (22)	Install	Hook one end of spring (22) on accelerator pedal (40) and other end on spring attachment plate on floor plate
13	Engine compartment	a. Two clamps (17 and 21)	Position	On accelerator cable (8)
		b. Two cap screws (16 and 20), lock washers (15 and 19), and nuts (14 and 18)	Install	
		c. Bracket (13)	Position	
		d. Four cap screws (12), lock washers (11) and nuts (10)	Install	
		e. Clamp (7)	Position	On accelerator cable (8)
		f. Two cap screws (6)	Position	On clamp (7)
		g. Spacer (9)	Position and install	On two cap screws (6)

2-15. FUEL SYSTEM MAINTENANCE (cont)

i. Accelerator/Throttle Control (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
13 (cont)		h. Two washers (5), lock washers (4), and nuts (3)	Install	
		i. Ball joint (2)	Install	On accelerator cable (8) then connect to fuel injection pump throttle lever
		j. Nut (1)	Install	
ADJUSTMENT				
14	Engine compartment	a. Nut (1)	Remove	
		b. Ball joint (2)	Disconnect	From fuel injection pump throttle lever
		c. Ball joint (2)	Adjust and connect	Adjust for minimum slack in accelerator cable by threading further onto cable (8); increase slack by threading out of accelerator cable. Tighten nut (29)
		NOTE When connecting ball joint (2) to throttle lever be sure you don't move throttle lever.		
				Connect to throttle lever; if all slack in cable has been removed, reinstall nut (1)
		NOTE If too much or not enough slack in accelerator cable, perform step 15.		
15	Operator's compartment	a. Two nuts (26) and lock washer (27)	Remove	
		b. Ball joint (28)	Disconnect	From accelerator pedal (40)
		c. Ball joint (28)	Adjust and connect	Adjust for minimum slack in accelerator cable by threading further onto cable (8); increase slack by threading out of accelerator cable. Tighten nut (29)
		NOTE When connecting ball joint (28) to accelerator lever, be sure you don't move throttle lever.		
				Connect to accelerator pedal and check slack; if too much or too little slack, repeat above adjustment. Reinstall two nuts (26) and lock washer (27). Repeat step 14 if necessary.

2-16. SPARK ARRESTING MUFFLER AND EXHAUST PIPE MAINTENANCE

This task covers:
- a. Periodic cleaning
- b. Removal
- c. Cleaning
- d. Inspection
- e. Installation/Replacement

INITIAL SETUP

TOOLS

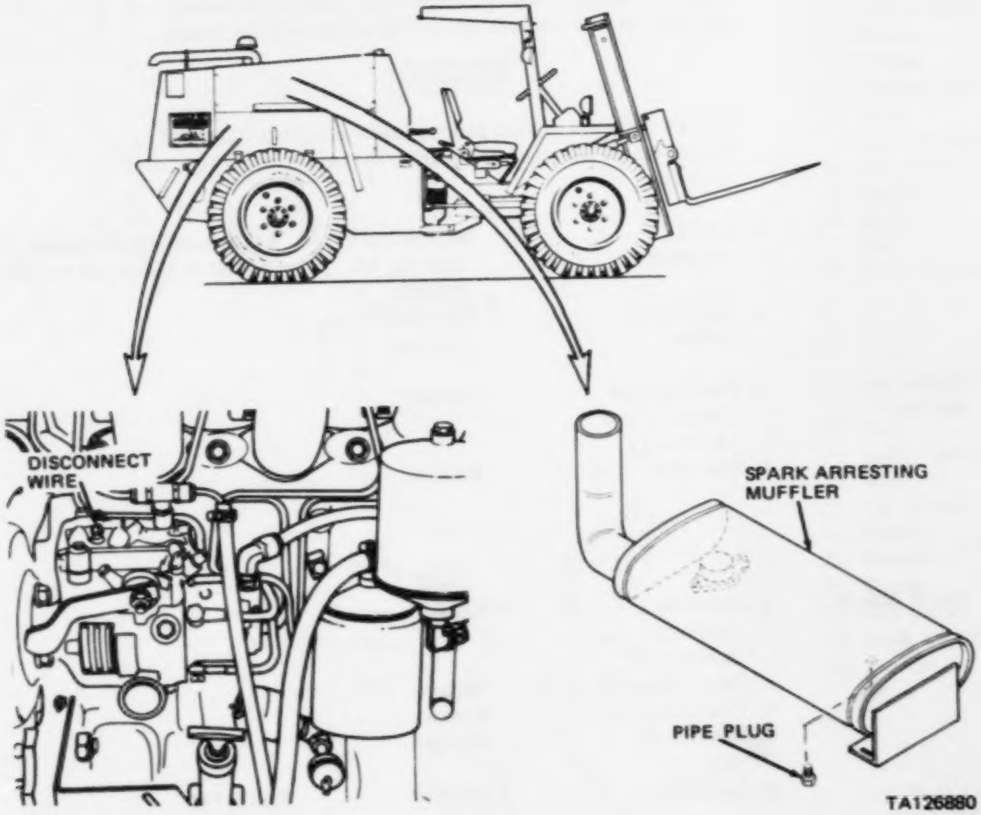
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Tarpaulin
Gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off, parking brake set, and transmission direction selector in N position.
2-53c	Right side panel removed.



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2-16. SPARK ARRESTING MUFFLER AND EXHAUST PIPE MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
PERIODIC CLEANING				
1	Engine compartment	a. Pipe plug b. Fuel injection pump terminal wire	Remove Disconnect	
2	Rear of vehicle	Flat piece of wood	Hold	Against exhaust pipe outlet; remove after step 3 is completed
3	Operator's compartment	a. IGNITION switch	Place in ON position	

NOTE

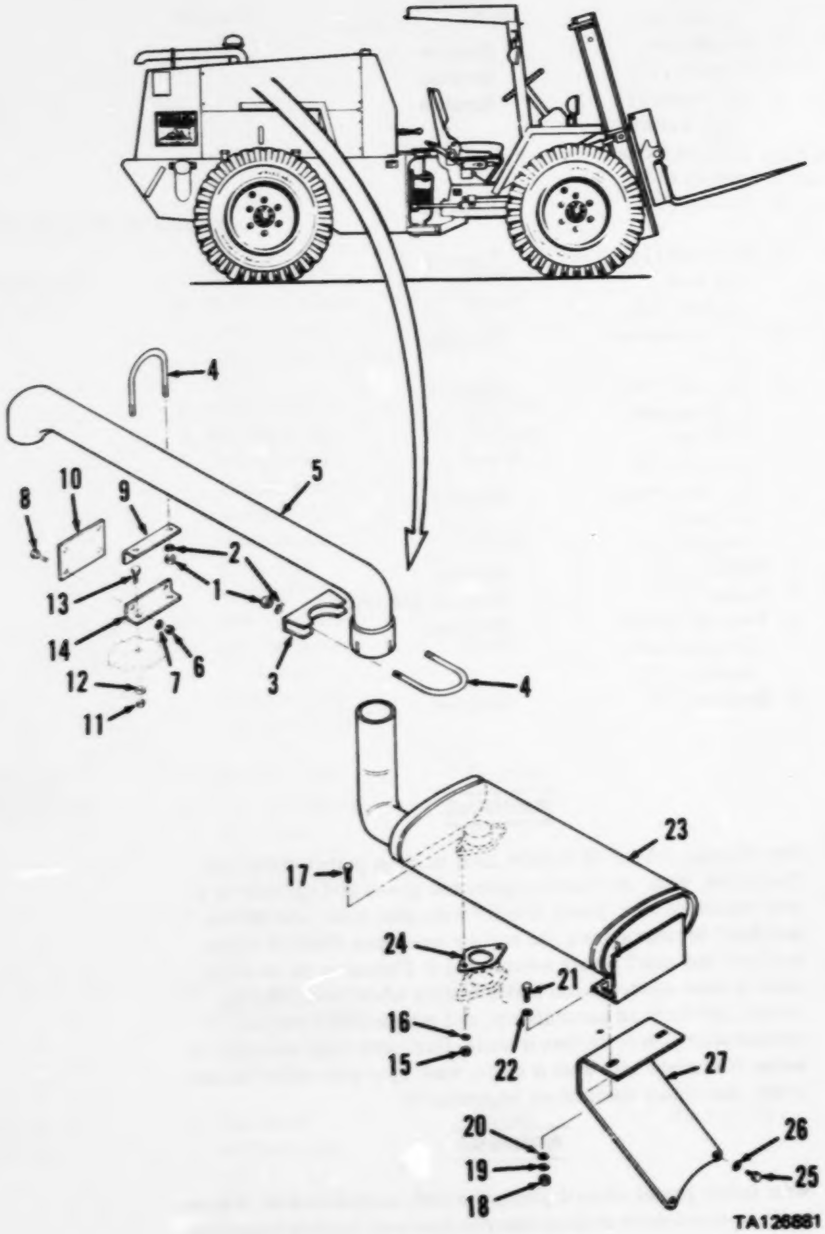
Place tarpaulin on engine to protect it from soot in following step. Be sure tarpaulin is not interfering with fan blades.

WARNING

Be sure you have applied parking brake and placed transmission direction selector in N position to prevent injury to personnel.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. START pushbutton	Depress and hold for 30 seconds	Loose soot will be expelled through pipe hole in bottom of muffler
		c. IGNITION switch	Place in OFF position	
4	Engine compartment	a. Fuel injection pump terminal wire b. Pipe plug	Connect Reinstall	
REMOVAL				
5	Top of vehicle	a. Four nuts (1) and lock washers (2) b. Two clamps (3) c. Two U bolts (4) d. Exhaust pipe (5) e. Top hood	Remove Remove Remove Remove Remove	 Para 2-53d
6	Radiator shroud, top	a. Four nuts (6) b. Four lock washers (7)	Remove Remove	

2-16. SPARK ARRESTING MUFFLER AND EXHAUST PIPE MAINTENANCE (cont)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KEY

1. Nuts
2. Lock washers
3. Clamps
4. U bolts
5. Exhaust pipe
6. Nuts
7. Lock washers
8. Cap screws
9. Bracket
10. Support
11. Nuts
12. Lock washers
13. Cap screws
14. Bracket
15. Nuts
16. Lock washers
17. Cap screws
18. Nuts
19. Lock washers
20. Washers
21. Cap screws
22. Washers
23. Muffler
24. Gasket
25. Cap screws
26. Lock washers
27. Bracket

2-16. SPARK ARRESTING MUFFLER AND EXHAUST PIPE MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
6 (cont)		c. Four cap screws (8)	Remove	
		d. Bracket (9)	Remove	
		e. Support (10)	Remove	
		f. Two nuts (11), lock washers (12), and cap screws (13)	Remove	
		g. Bracket (14)	Remove	
7	Engine compartment	a. Two nuts (15) and lock washers (16)	Remove	
		b. Two cap screws (17)	Remove	
		c. Two nuts (18), lock washers (19) and washers (20)	Remove	
		d. Two cap screws (21) and washers (22)	Remove	
		e. Muffler (23)	Remove	
		f. Gasket (24)	Remove and discard	
		g. Two cap screws (25) and lock washers (26)	Remove	
		h. Bracket (27)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-16. SPARK ARRESTING MUFFLER AND EXHAUST PIPE MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
8		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air. Remove rust with stiff wire brush
INSPECTION				
9		All parts	Inspect	Replace if cracked, damaged, worn, dented, or threads damaged
INSTALLATION/REPLACEMENT				
10	Engine compartment	a. Bracket (27)	Position	
		b. Two lock washers (26) and cap screws (25)	Install	
		c. Gasket (24)	Position	
		d. Muffler (23)	Position	
		e. Two washers (22) and cap screws (21)	Install	
		f. Two washers (20), lock washers (19) and nuts (18)	Install	
		g. Two cap screws (17), lock washers (16) and nuts (15)	Install	
11	Radiator shroud, top	a. Bracket (14)	Position	
		b. Two cap screws (13), lock washers (12), and nuts (11)	Install	
		c. Support (10) and bracket (9)	Position	
		d. Four cap screws (8), lock washers (7), and nuts (6)	Install	
12	Top of vehicle	a. Top hood	Install	Para 2-53d
		b. Exhaust pipe (5)	Install	
		c. Two U bolts (4)	Position	
		d. Two clamps (3)	Position	
		e. Four lock washers (2) and nuts (1)	Install	

2-17. COOLING SYSTEM MAINTENANCE

a. Radiator Servicing.

This task covers radiator servicing.

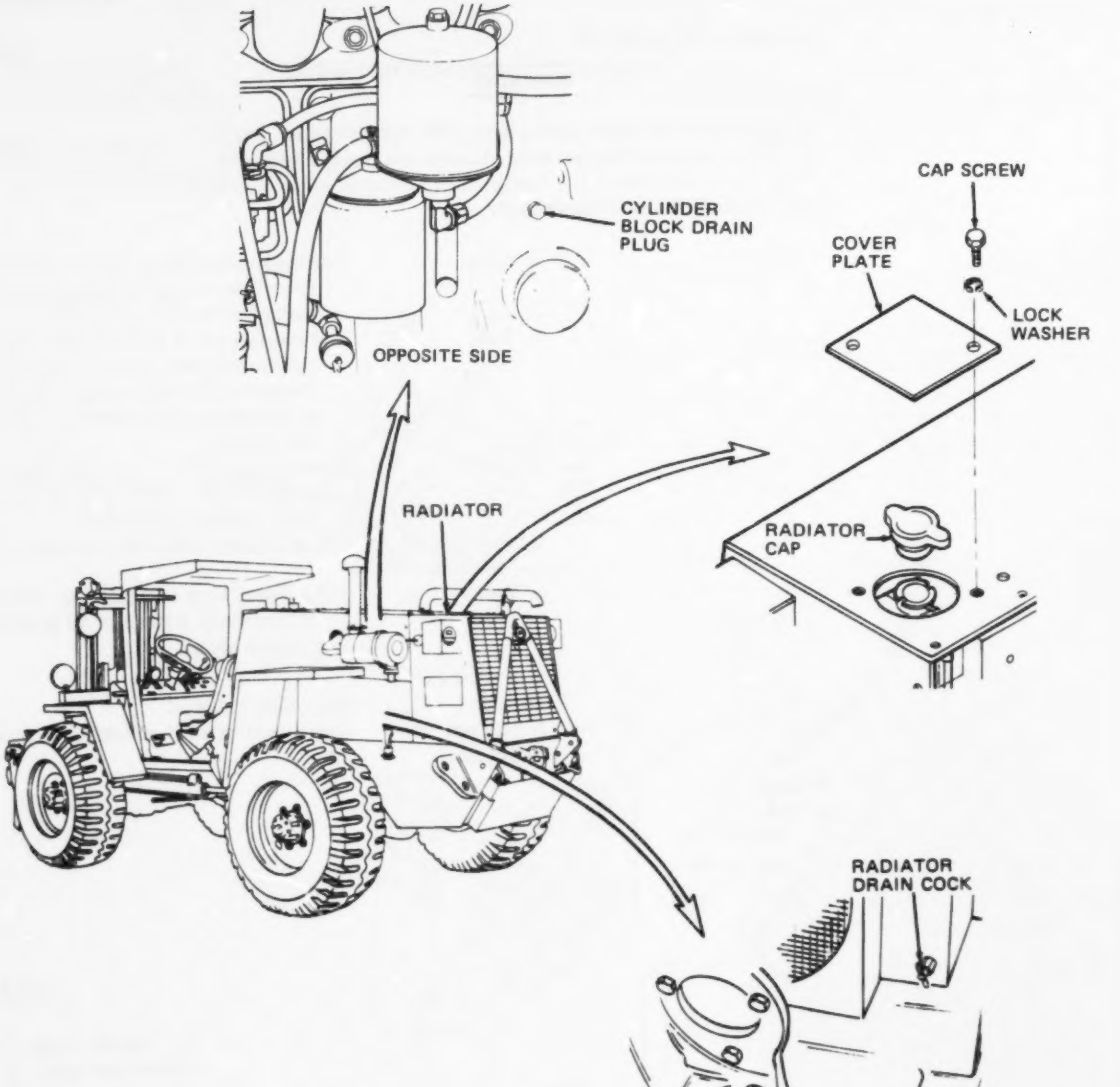
INITIAL SETUP

TOOLS		EQUIPMENT CONDITION	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654	Paragraph	Condition Description
			Vehicle on level surface, parking brake applied, engine warm, and turned off.
MATERIALS/PARTS		2-53c	Left and right side panels removed.
Two gallons ethylene glycol			

STEP	LOCATION	ITEM	ACTION	REMARKS
SERVICING				
1	Top, rear of vehicle	a. Two cap screws, lock washers and cover plate	Remove	
		WARNING Remove radiator cap slowly to release pressure before completely removing when engine is hot.		
		b. Radiator cap	Remove	
2	Engine compartment left, rear	Radiator drain cock	Open, drain coolant; then close	
3	Engine compartment, plug right, middle	Cylinder block drain plug	Remove, drain coolant, then reinstall	
4	Top, rear of vehicle	a. Radiator	a. Fill and flush cooling system	Use clean water or chemical cooling system cleaner
		NOTE **To flush with water, fill radiator with water and operate engine for 15 minutes. Drain system completely. Close radiator drain cock and reinstall cylinder block drain plug.**		

2-17. COOLING SYSTEM MAINTENANCE (cont)

a. Radiator Servicing (cont)


CYLINDER BLOCK DRAIN PLUG
OPPOSITE SIDE
CAP SCREW
COVER PLATE
LOCK WASHER
RADIATOR
RADIATOR CAP
RADIATOR DRAIN COCK
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2-17. COOLING SYSTEM MAINTENANCE (cont)

a. Radiator Servicing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
SERVICING (cont)				
4 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
			b. Clean	Use compressed air to clean exterior and to remove foreign matter obstructing passage of air through radiator
			c. Fill	Use solution of 50 percent water and 50 percent ethylene glycol. Capacity is 16 quarts. Fill with coolant solution to two inches below level of radiator cap opening
		b. Radiator cap	a. Install	Operate engine for 15 minutes. Check for coolant leaks at drain plug and drain cock; tighten if necessary
			b. Remove and reinstall	Check coolant level, add if necessary
		c. Coolant recovery tank	a. Remove cap	Fill recovery tank half full with solution of 50 percent water and 50 percent ethylene glycol
			b. Install cap	
			Position	On radiator shroud
			Install and tighten	Until cover plate is securely mounted
		d. Cover plate e. Two lock washers and cap screws		

2-17. COOLING SYSTEM MAINTENANCE (cont)

b. Hoses.

This task covers: a. Removal b. Installation/Replacement

INITIAL SETUP

TOOLS

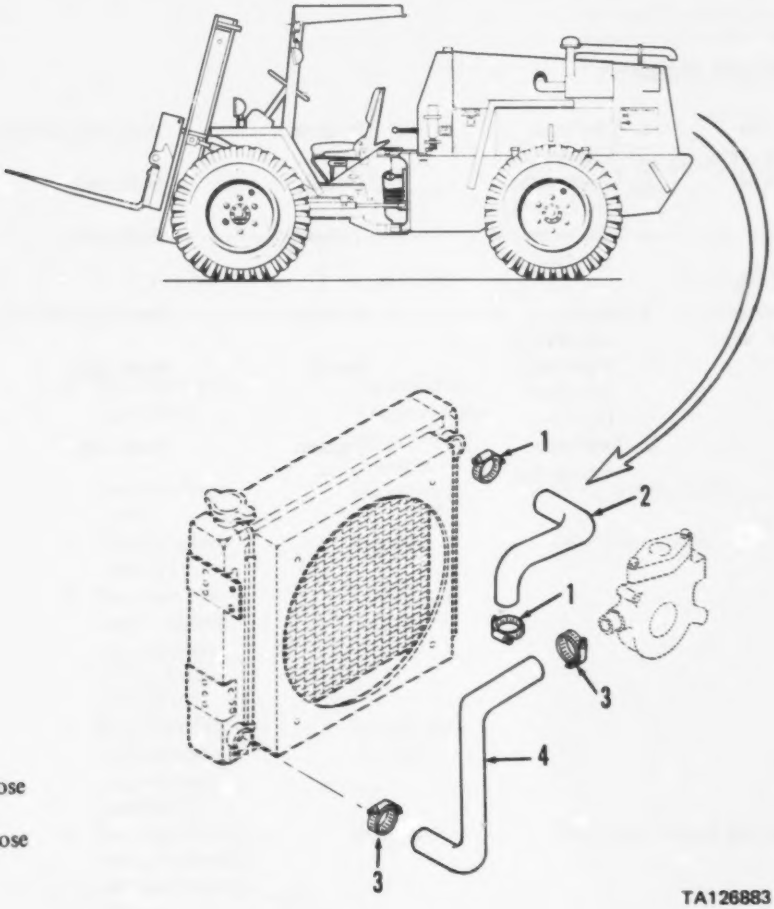
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Two gallons ethylene glycol

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle on level surface and parking brake applied.
2-17a	Radiator drained.



KEY

1. Hose clamps
2. Upper radiator hose
3. Hose clamps
4. Lower radiator hose

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2-17. COOLING SYSTEM MAINTENANCE (cont)

b. Hoses (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear, left side of vehicle	a. Two hose clamps (1)	Loosen	Both ends
		b. Upper radiator hose (2)	Remove	
2	Engine compartment rear, right side of vehicle	a. Two hose clamps (3)	Loosen	Both ends
		b. Lower radiator hose (4)	Remove	
INSTALLATION/REPLACEMENT				
3	Engine compartment rear, right side of vehicle	a. Two hose clamps (3)	Position	Both ends of hose (4)
		b. Lower radiator hose (4)	Install	Both ends
		c. Two hose clamps (3)	Tighten	Both ends
4	Engine compartment rear, left side of vehicle	a. Two hose clamps (1)	Position	Both ends of hose (2)
		b. Upper radiator hose (2)	Install	Both ends
		c. Two hose clamps (1)	Tighten	Both ends

2-17. COOLING SYSTEM MAINTENANCE (cont)

c. *Radiator and Shroud.*

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly
- f. Installation/Replacement

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

TOOLS
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Radiator mounts

EQUIPMENT CONDITION

Paragraph	Condition Description
2-17a	Cover plate and radiator cap removed, and radiator and engine drained.
2-17b	Radiator hoses removed.
2-38g	Transmission oil cooler removed

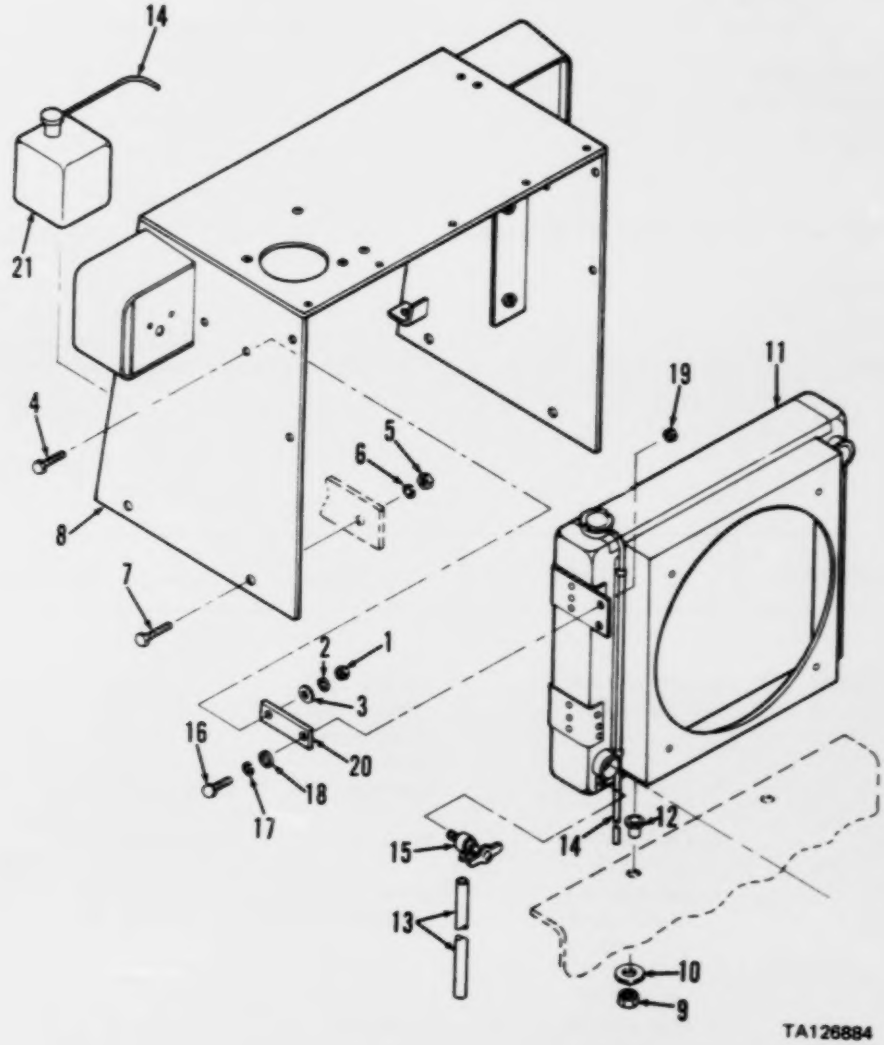
NOTE

Removal of fan (para 2-17f) may be necessary.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Rear chassis	a. Two rear blackout lights	Tag and disconnect leads from wiring harness	
		b. Overflow hose (14)	Disconnect	From reservoir (21)
		c. Coolant reservoir (21)	Remove	Lift from vehicle
		d. Two nuts (1), lock washers (2), washers (3) and cap screws (4)	Loosen and remove	
		e. Four nuts (5), lock washers (6) and cap screws (7)	Loosen and remove	
		f. Two cap screws, nuts, lock washers, and harness clamps	Remove	Located at top of shroud
		g. Radiator shroud (8)	Remove	Use sling and hoist to lift from vehicle
		h. Two nuts (9) and snubbing washers (10)	Loosen and remove	Support radiator

2-17. COOLING SYSTEM MAINTENANCE (cont)

c. *Radiator and Shroud (cont).*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KEY

1. Nuts	8. Radiator shroud	15. Drain valve
2. Lock washers	9. Nuts	16. Cap screws
3. Washers	10. Snubbing washers	17. Lock washers
4. Cap screws	11. Radiator	18. Washers
5. Nuts	12. Mounts	19. Nuts
6. Lock washers	13. Drain hose	20. Straps
7. Cap screws	14. Overflow hose	21. Coolant reservoir

2-17. COOLING SYSTEM MAINTENANCE (cont)

c. *Radiator and Shroud (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
1 (cont)		**CAUTION** Exercise care when removing radiator (11). Do not allow radiator fins to be damaged by engine fan or other parts during removal.		
		i. Radiator (11)	Remove	Carefully lift from vehicle
		j. Two mounts (12)	Remove and discard as required	
DISASSEMBLY				
2	Radiator (11)	a. Drain hose (13)	Remove	Pull from valve (15)
		b. Overflow hose (14)	Remove	Unclip from radiator and pull from fitting at filler neck
		NOTE Disassemble remaining parts only if required for replacement.		
		c. Drain valve (15)	Loosen and remove	
		d. Two cap screws (16), washers (17 and 18) and nuts (19)	Loosen and remove	Support strap (20)
		e. Two straps (20)	Remove	
CLEANING				
3		Hoses (13 and 14) and coolant reservoir (21)	Clean	Wipe with clean, damp cloth
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		

2-17. COOLING SYSTEM MAINTENANCE (cont)

c. Radiator and Shroud (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
5		Radiator shroud (8)	Inspect	Repair broken welds and cracks by welding (notify direct support maintenance)
6		Hoses (13 and 14) and reservoir (21)	Inspect	Replace if cracked, split or deteriorated
7		Straps (20)	Inspect	Replace if cracked or distorted
8		Drain valve (15)	Inspect	Replace if threads damaged, or if valve obstructed or damaged
9		All hardware	Inspect	Replace if worn, or if threads damaged
10		Radiator (11)	Inspect cooling fins and core	Straighten bent fins, using care not to damage core. Repair leaking core tubes by soldering (notify direct support maintenance)
REASSEMBLY				
11	Radiator (11)	a. Strap (20)	Position	
		b. Nut (19), cap screw (16) and washers (17 and 18)	Install and tighten	Tighten hand-tight only
		c. Drain valve (15)	Install and tighten	Until valve opening faces bottom of radiator (11)
		d. Overflow hose (14)	Install	Push on filler neck fitting and clips
		e. Drain hose (13)	Install	Push on valve opening
INSTALLATION/REPLACEMENT				
12	Rear chassis	a. Two new mounts (12)	Install	In top of radiator mounting holes when required

2-17. COOLING SYSTEM MAINTENANCE (cont)

c. Radiator and Shroud (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
12 (cont)		**CAUTION** Exercise care when installing radiator (11). Do not allow radiator fins to be damaged by engine fan or other parts during installation.		
		b. Radiator (11)	Install	Carefully lower onto mounts (12)
		c. Two snubbing washers (10) and nuts (9)	Install and tighten	Tighten nut (9) until mount (12) expands equally at top and bottom of frame member
		d. Radiator shroud (8)	Position	Use sling and hoist to lower onto vehicle
		e. Four cap screws (7), lock washers (6) and nuts (5)	Install and tighten	Until radiator guard is securely mounted
		f. Two cap screws (4), washers (3), lock washers (2) and nuts (1)	Install and tighten	Tighten to 20-30 pounds foot torque
		g. Two cap screws (16) and nuts (19)	Tighten	Tighten to 20-30 pounds foot torque
		h. Coolant reservoir (21)	Install	
		i. Overflow hose (14)	Install	Push on reservoir cap fitting
		j. Two cap screws, nuts, lock washers, and harness clamps	Install	Located at top of shroud
		k. Two rear blackout lights	Connect	To wiring harness
		l. Fan	Install if removed	Para 2-17f

2-17. COOLING SYSTEM MAINTENANCE (cont)

d. Thermostat and Housing.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Testing
- e. Installation/Replacement

INITIAL SETUP

TOOLS

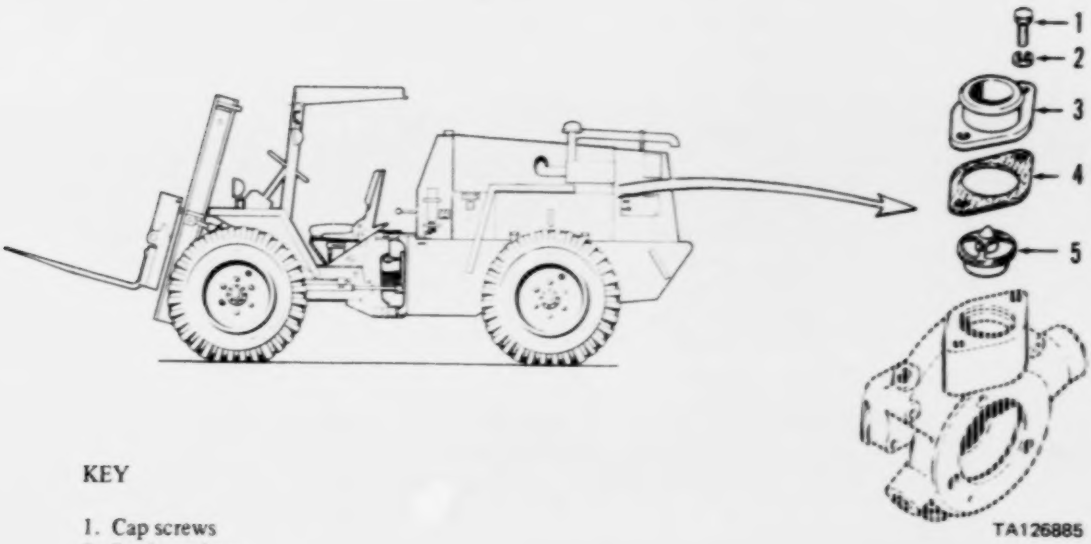
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Hot water
Glass container
Thermometer
Gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Side panels removed.
2-17a	Radiator drained.
2-17b	Upper radiator hose removed.



KEY

1. Cap screws
2. Lock washers
3. Housing
4. Gasket
5. Thermostat

2-17. COOLING SYSTEM MAINTENANCE (cont)

d. Thermostat and Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment	a. Two cap screws (1) and lock washers (2)	Remove	
		b. Housing (3)	Remove	
		c. Gasket (4)	Remove and discard	
		d. Thermostat (5)	Lift out and remove	
CLEANING				

WARNING

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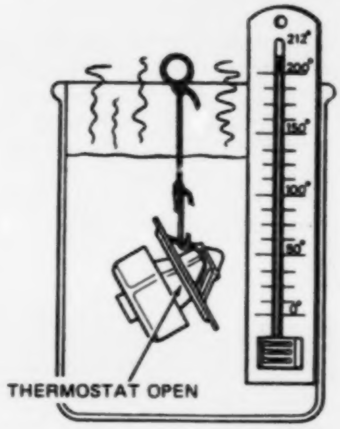
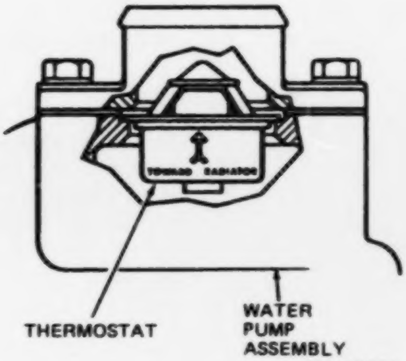
WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air. Remove all gasket material from housing and water pump mating surfaces
INSPECTION				
3		All parts	Inspect	Replace if cracked, damaged, or damaged threads
TESTING				
4		Thermostat (5)	Test	Submerge in hot (175°) water with thermometer. Heat water. Thermostat shall just start to open between 175-182 degrees F and be completely open at 202 degrees F. Remove and dry with compressed air. Replace thermostat if it does not meet specification

2-17. COOLING SYSTEM MAINTENANCE (cont)

d. Thermostat and Housing (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
4 (cont)				 212° 200° 150° 100° 50° 0° THERMOSTAT OPEN TA126886
INSTALLATION/REPLACEMENT				
5		a. Thermostat (5)	Install	 TOWARD RADIATOR THERMOSTAT WATER PUMP ASSEMBLY TA126887
		b. Gasket (4)	Install	
		c. Housing (3)	Position	
		d. Two lock washers (2) and cap screws (1)	Install	Tighten to 35-42 pounds foot torque

2-17. COOLING SYSTEM MAINTENANCE (cont)

e. Water Pump Assembly.

This task covers: a. Removal b. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

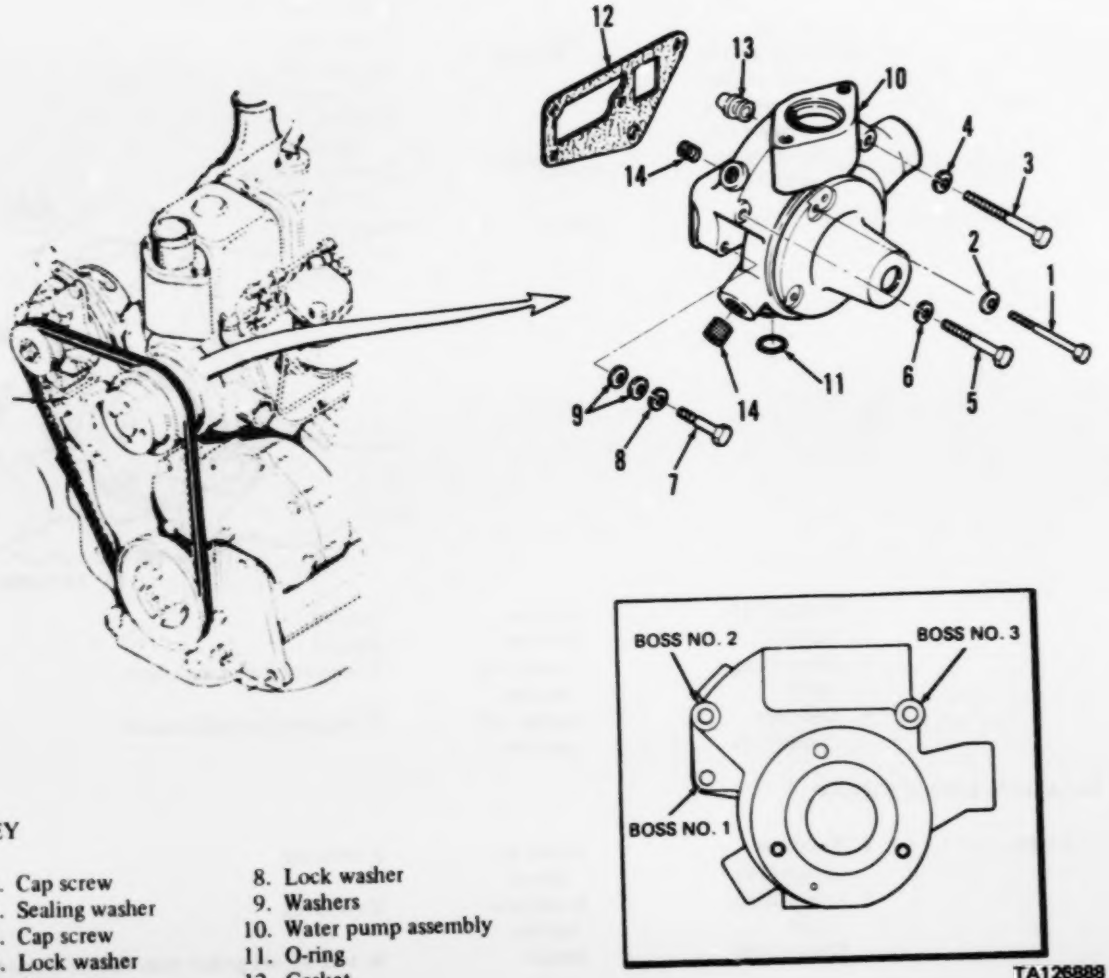
Gasket

O-ring

Lubriplate

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Side panels removed.
2-17a	Radiator drained
2-17b	Hoses disconnected and removed.
2-17d	Thermostat and housing removed.
2-17f	Fan and drive belt removed.

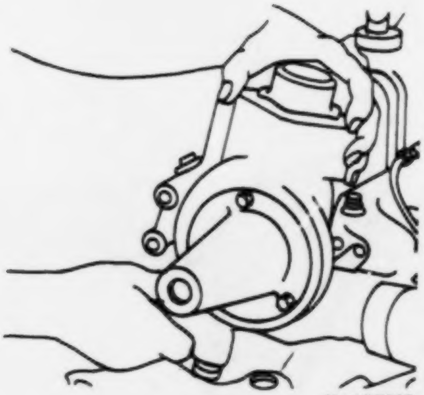


KEY

1. Cap screw
2. Sealing washer
3. Cap screw
4. Lock washer
5. Cap screw
6. Lock washer
7. Cap screw
8. Lock washer
9. Washers
10. Water pump assembly
11. O-ring
12. Gasket
13. Inlet fitting
14. Pipe plugs

2-17. COOLING SYSTEM MAINTENANCE (cont)

e. Water Pump Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine, rear	a. Cap screw (1) and sealing washer (2)	Remove	
		b. Cap screw (3) and lock washer (4)	Remove	
		c. Cap screw (5) and lock washer (6)	Remove	Move alternator mounting strap out of way
		d. Cap screw (7), lock washer (8) and two washers (9)	Remove	
		e. Water pump assembly (10)	Remove	 TA128889
		f. O-ring (11)	Remove	Discard
		g. Gasket (12)	Remove	Discard
		h. Inlet fitting (13)	Loosen and remove	If required for replacement
		i. Two pipe plugs (14)	Loosen and remove	If required for replacement
INSTALLATION/REPLACEMENT				
2	Engine, rear	a. Two pipe plugs (14)	Install and tighten	If removed
		b. Inlet fitting (13)	Install and tighten	If removed
		c. Gasket (12)	Install	Be sure all old gasket material is removed from mounting surface

2-17. COOLING SYSTEM MAINTENANCE (cont)

e. Water Pump Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
2 (cont)		d. O-ring (11)	Install	
		e. Water pump assembly (10)	Position	On cylinder head and timing gear housing
		f. Two washers (9) lock washer (8), and cap screw (7) (2-1/4 inches long)	Install	In boss no. 1
		g. Lock washer (6) and cap screw (5) (3 inches long)	Install	Position alternator mounting strap, then install in boss no. 2
		h. Lock washer (4) and cap screw (3) (2-3/4 inches long)	Install	In boss no. 3
		i. Cap screws (3, 5, and 7)	Tighten	To 35-42 pounds foot torque
		j. Sealing washer (2) and cap screw (1)	Install	Tighten to 35-42 pounds foot torque

2-17. COOLING SYSTEM MAINTENANCE (cont)

f. Fan and Belt.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Adjustment

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

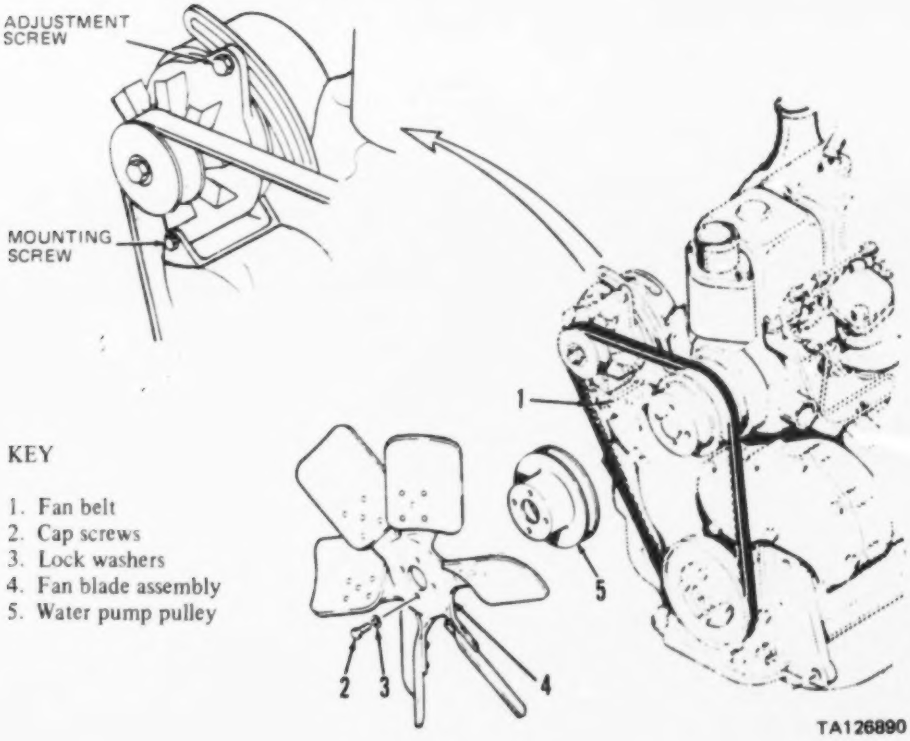
MATERIALS/PARTS
None

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Side panels removed

NOTE

Removal or adjustment of fan belt requires removal of left side panel only.



KEY

1. Fan belt
2. Cap screws
3. Lock washers
4. Fan blade assembly
5. Water pump pulley

2-17. COOLING SYSTEM MAINTENANCE (cont)

f. Fan and Belt (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Alternator	a. Adjustment screw and mounting screw	Remove	
		b. Alternator	Remove	
		c. Fan belt (1)	Remove	
2	Engine	a. Four cap screws (2) and lock washers (3)	Remove	
		b. Fan blade assembly (4)	Remove	
		c. Water pump pulley (5)	Remove	
CLEANING				

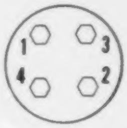
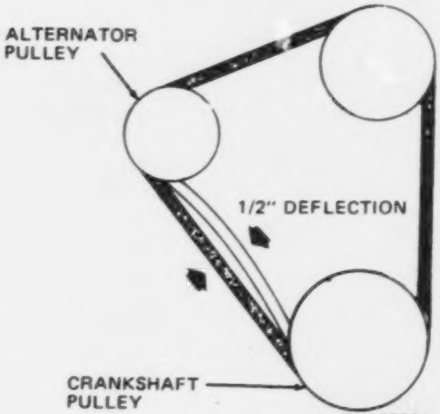
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		All parts	Clean	Use cleaning solvent P-D-680; dry thoroughly
INSPECTION				
4		Fan belt (1)	Inspect	Replace if cracked, ruptured, or worn
5		Fan blade assembly (4)	Inspect	Replace if blades are cracked, bent or broken
6		Water pump pulley (5)	Inspect	Replace if bent, cracked, or mounting holes damaged
INSTALLATION/REPLACEMENT				
7	Engine	a. Water pump pulley (5)	Position	On water pump assembly
		b. Fan blade assembly (4)	Position	On water pump pulley

2-17. COOLING SYSTEM MAINTENANCE (cont)

f. Fan and Belt (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
7 (cont)		c. Four lock washers (3) and cap screws (2)	Install	Tighten in sequence shown below  TA301520
		d. Fan belt (1)	Install	
8	Alternator	a. Alternator	Install	
		b. Adjustment screw and mounting screw	Install	
FAN BELT ADJUSTMENT				
9	Engine	Fan belt (1)	Depress	Belt should deflect 1/2 inch as shown  TA126891
10	Alternator	a. Adjustment screw and mounting screw	Loosen	
		b. Alternator	Position	Move toward engine to loosen fan belt or away from engine to tighten; use pry bar if necessary
		c. Adjustment screw and mounting screw	Tighten	When proper deflection of fan belt is obtained (step 9 above)

2-18. GAGES MAINTENANCE

a. Gage Bulb Replacement.

This task covers replacement of fuel level gage and oil pressure gage bulbs.

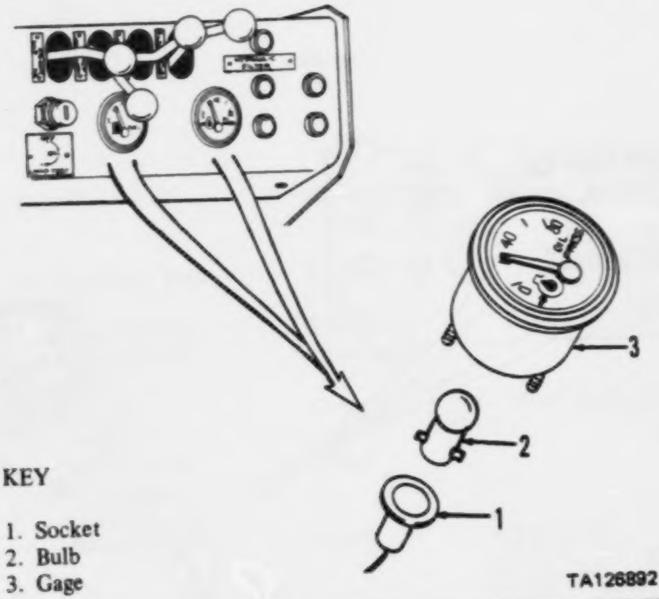
INITIAL SETUP

TOOLS
None

MATERIALS/PARTS
Replacement bulb

EQUIPMENT CONDITION

Paragraph	Condition Description
	IGNITION switch in OFF position and key removed.
2-53h	Noise baffle mat rod removed and mat pulled up and over instrument panel for access to bottom of instrument panel.



KEY

1. Socket
2. Bulb
3. Gage

TA126892

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel, bottom	a. Socket (1) b Bulb (2)	Remove Remove	Grasp and pull out Discard
INSTALLATION				
2	Instrument panel, bottom	a. Bulb (2) b. Socket (1)	Install Install	 Push in until it snaps into position

2-18. GAGES MAINTENANCE (cont)

b. Gages Replacement.

This task covers replacement of fuel level and oil pressure gages.

INITIAL SETUP

TOOLS

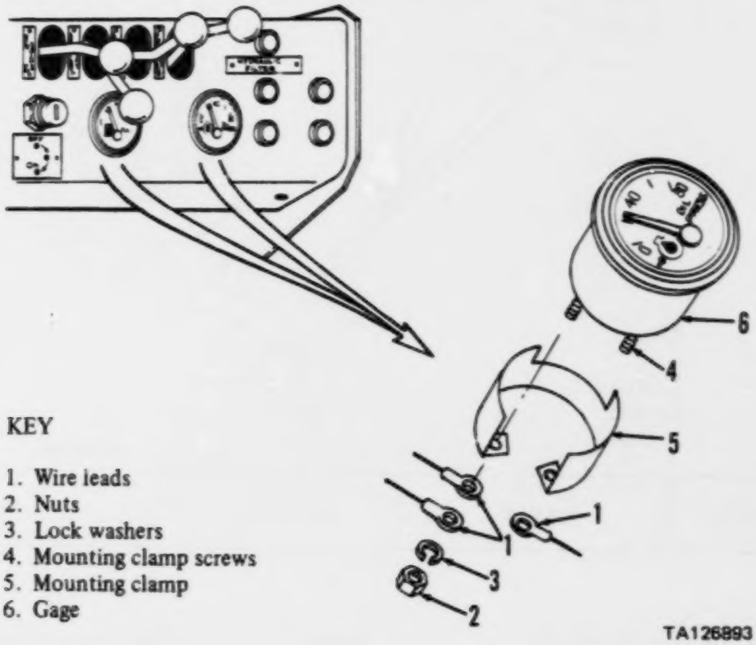
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Replacement gage

EQUIPMENT CONDITION

Paragraph	Condition Description
2-18a	Gage socket and bulb removed.



KEY

1. Wire leads
2. Nuts
3. Lock washers
4. Mounting clamp screws
5. Mounting clamp
6. Gage

TA126893

2-18. GAGES MAINTENANCE (cont)

b. Gages Replacement (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel, bottom	a. Two nuts (2) and lock washers (3)	Remove	
		b. Three wire leads (1)	Tag and disconnect	
		c. Two mounting clamp screws (4)	Loosen both evenly	Loosen and remove mounting clamp (5)
		d. Mounting clamp (5)	Remove	
2	Instrument panel, top	Gage (6)	Remove	
INSTALLATION				
3	Instrument panel, top	Gage (6)	Position	
4	Instrument panel, bottom	a. Mounting clamp (5)	Position	On mounting clamp screws (4)
		b. Two mounting clamp screws (4)	Tighten both evenly	Until gage is securely mounted
		c. Three wire leads (1)	Connect	Note tags for correct connection
		d. Two lock washers (3) and nuts (2)	Install	
		e. Socket and bulb	Install	Para 2-18a

Section V. ELECTRICAL SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the:

- Batteries
- Starting system
- Charging system
- Lights
- Horn

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of organizational maintenance.

	Para
Troubleshooting Symptom Index	2-19
Battery System Troubleshooting	2-20
Starting System Troubleshooting	2-21
Charging System Troubleshooting	2-22
Horn and Back-up Alarm Troubleshooting	2-23
Light Systems Troubleshooting	2-24
Instrument Panel Troubleshooting	2-25
Alternator Maintenance	2-26
Starting System Maintenance	2-27
Starter	2-27a
Starter Relay and 25 AMP Circuit Breaker	2-27b
Instrument Panel Maintenance	2-28
Flood Light Switches and Circuit Breakers	2-28a
START Switch and VEHICLE LIGHTS Switch	2-28b
Ignition Switch and Circuit Breaker	2-28c
Lockout Relay	2-28d
Warning Lights and Diodes	2-28e
Auxiliary Panel Maintenance	2-29
Slave Receptacle	2-29a
Hourmeter	2-29b
Light Systems Maintenance	2-30
Flood Lights	2-30a
Front Blackout Light	2-30b
Rear Blackout Lights	2-30c
Stop and Tail Light	2-30d
Sending Units and Switches Maintenance	2-31
Fuel Gage Sending Unit	2-31a
Neutral Start and Back-up Alarm Switches	2-31b
Engine and Transmission Temperature Switches	2-31c
Engine Oil Pressure Switch and Sending Unit	2-31d
Stop Light and Hydraulic Filter Switches	2-31e
Horn and Back-up Alarm Maintenance	2-32
Horn	2-32a
Horn Switch	2-32b
Back-up Alarm	2-32c
Battery System Maintenance	2-33
Battery Cover	2-33a
Battery Cables and Batteries	2-33b
Wiring Harness Maintenance	2-34
Front Wiring Harness	2-34a
Rear Wiring Harness	2-34b

2-19. TROUBLESHOOTING SYMPTOM INDEX

NOTE

An electrical system wiring schematic is located at the back of this manual in appendix F.

	Para/Malfunction	Page
BATTERY SYSTEM		
All electrical systems are weak	2-20/1	2-99
Batteries are hot or use excessive water	2-20/2	2-100
STARTING SYSTEM		
Starter cranks too slowly	2-21/1	2-100
Starter fails to crank	2-21/2	2-101
Starter cranks continuously	2-21/3	2-103

2-19. TROUBLESHOOTING SYMPTOM INDEX (cont)

	Para/Malfunction	Page
CHARGING SYSTEM		
Abnormal alternator light operation	2-22/1	2-103
Alternator output low, unsteady, or zero	2-22/2	2-104
HORN SYSTEM		
Horn does not sound	2-23/1	2-105
Back-up alarm does not sound	2-23/2	2-106
LIGHT SYSTEMS		
Front flood lights inoperative	2-24/1	2-107
Front black out light inoperative	2-24/2	2-107
Black out tail lights inoperative	2-24/3	2-108
Service tail lights inoperative	2-24/4	2-109
Black out stop lights inoperative	2-24/5	2-109
Service stop lights inoperative	2-24/6	2-110
Rear flood lights inoperative	2-24/7	2-110
Gage lights inoperative	2-24/8	2-111
INSTRUMENT PANEL		
Warning lights inoperative	2-25/1	2-112
Warning lights, back-up alarm, and electric fuel pump inoperative	2-25/2	2-113

2-20. BATTERY SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ALL ELECTRICAL SYSTEMS ARE WEAK

Step 1. Connect voltmeter leads to connectors of negative battery cable at battery post and starter ground.
Note voltmeter indication while an assistant cranks engine.

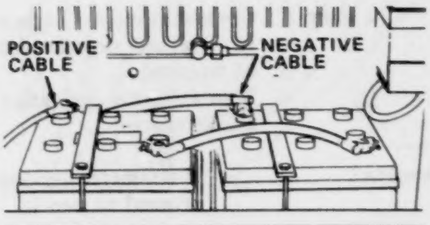
a. If voltmeter indicates less than 0.5 Vdc, proceed to step 2.

b. If voltmeter indicates more than 0.5 Vdc, replace the negative battery cable (para 2-33b)

Step 2. Connect voltmeter leads to connectors of positive battery cable at battery post and starter B terminal.
Note voltmeter indication while an assistant cranks engine.

a. If voltmeter indicates less than 0.5 Vdc, proceed to step 3.

b. If voltmeter indicates more than 0.5 Vdc, replace the positive battery cable (para 2-33b).



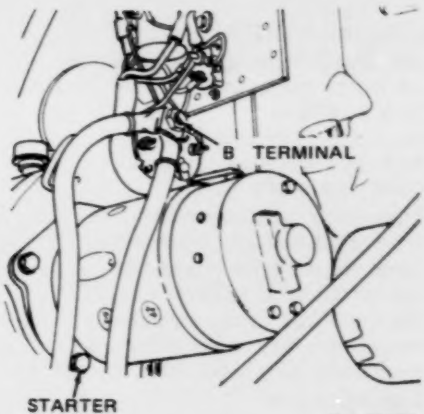
2-20. BATTERY SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ALL ELECTRICAL SYSTEMS ARE WEAK (cont)

Step 3. Connect voltmeter leads to positive and negative posts of one battery.
Note voltmeter indication while an assistant cranks engine.
Repeat for remaining battery.

If voltmeter indicates less than 9.6 Vdc, check the specific gravity of each battery cell. If there is more than 25 points variation (0.025) between individual cells, replace battery (para 2-33b).

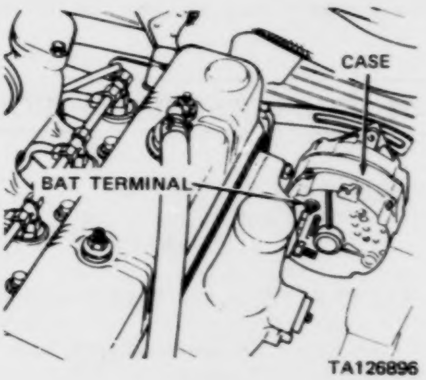


TA126895

2. BATTERIES ARE HOT OR USE EXCESSIVE WATER

Connect voltmeter leads to alternator BAT terminal and case (ground).
With all accessories turned off, operate engine at 1800 rpm and note voltmeter indication.

If voltmeter indicates more than 31 Vdc, replace alternator (para 2-26).



TA126896

2-21. STARTING SYSTEM TROUBLESHOOTING

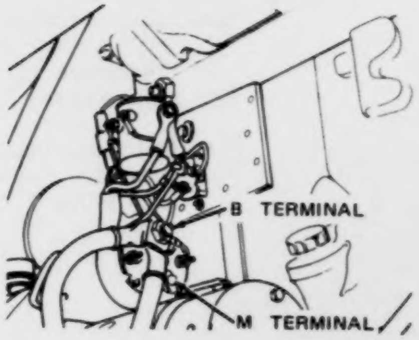
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. STARTER CRANKS TOO SLOWLY

Step 1. Connect positive voltmeter lead to solenoid B terminal and negative voltmeter lead to solenoid M terminal.
Note voltmeter indication while assistant cranks engine.

a. If voltmeter indicates less than 0.3 Vdc, proceed to step 2.

b. If voltmeter indicates more than 0.3 Vdc, replace starter assembly (para 2-27a).



TA126897

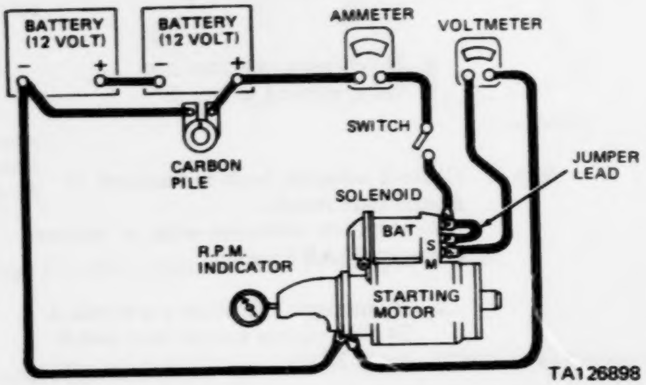
2-21. STARTING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. STARTER CRANKS TOO SLOWLY (cont)

Step 2. Remove starter assembly from engine (para 2-27a).
Connect no-load test setup to starter as illustrated, and adjust carbon pile for 20 Vdc indication on voltmeter.

a. If ammeter indicates 52 to 90 amperes and rpm indicator indicates 8000 to 13,000 rpm, disconnect starter from test setup and reinstall on engine (para 2-27a).


BATTERY (12 VOLT)
BATTERY (12 VOLT)
– +
– +
AMMETER
VOLTMETER
SWITCH
CARBON PILE
JUMPER LEAD
SOLENOID
BAT
S
M
R.P.M. INDICATOR
STARTING MOTOR
TA126898

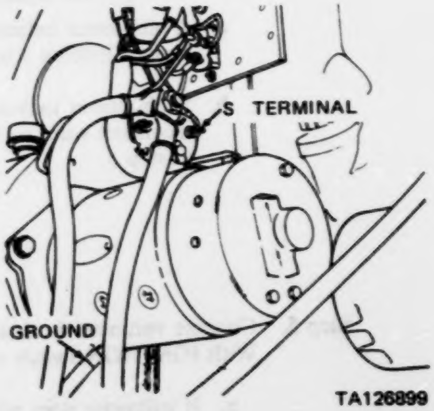
b. If ammeter does not indicate 52 to 90 amperes, or rpm indicator does not indicate 8000 to 13,000 rpm, record voltage, current and rpm, and replace starter assembly (para 2-27a). Forward test results to direct support maintenance with defective starter.

2. STARTER FAILS TO CRANK

Step 1. Connect voltmeter leads to S terminal of starter solenoid and ground.
Note voltmeter indication while an assistant depresses START switch.

a. If voltmeter indicates 24 Vdc, replace starter assembly (para 2-27a).

b. If voltmeter indicates less than 24 Vdc, or zero, proceed to step 2.


S TERMINAL
GROUND
TA126899

2-21. STARTING SYSTEM TROUBLESHOOTING (cont)

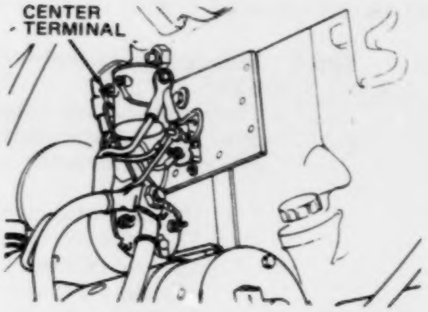
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. STARTER FAILS TO CRANK (cont)

Step 2. Connect voltmeter leads to center terminal of starter relay and ground. Note voltmeter indication while an assistant depresses START switch.

a. If voltmeter indicates 24 Vdc, replace starter relay (para 2-27b).

b. If voltmeter indicates zero volts, proceed to step 3.

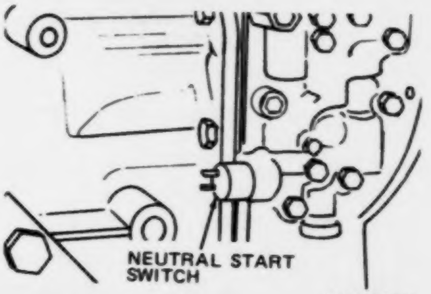


TA126900

Step 3. Connect voltmeter leads to terminals of neutral start switch. Note voltmeter indication while an assistant depresses START switch.

a. If voltmeter indication is a constant 24 Vdc, replace neutral start switch (para 2-31b).

b. If voltmeter indication is a constant zero volts, proceed to step 4.

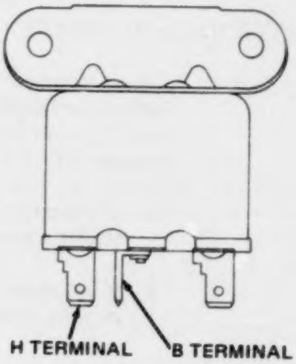


TA126901

Step 4. Tag and disconnect wires from lockout relay located at bottom center of instrument panel. Connect ohmmeter leads to B and H terminals of lockout relay.

a. If ohmmeter indicates more than 0.1 ohm, replace lockout relay (para 2-28d).

b. If ohmmeter indicates less than 0.1 ohm, reconnect wires to lockout relay and proceed to step 5.



TA126902

Step 5. Connect voltmeter leads to IGN and GRD terminals of IGNITION switch. With IGNITION switch set at ON, voltmeter should indicate 24 Vdc.

a. If voltmeter does not indicate 24 Vdc, proceed to step 6.

b. If voltmeter indicates 24 Vdc, proceed to step 7.

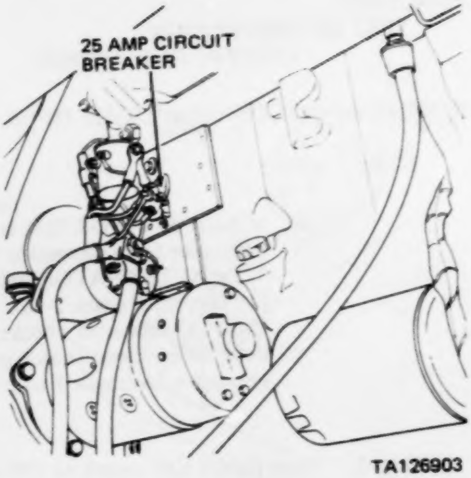
2-21. STARTING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. STARTER FAILS TO CRANK (cont)

Step 6. Turn IGNITION switch to OFF and remove key. Connect ohmmeter leads to terminals of 25 ampere circuit breaker and note ohmmeter indication.

If ohmmeter indicates more than 0.1 ohm, replace 25 ampere circuit breaker (para 2-27b).



TA126903

Step 7. Tag and disconnect wires from START switch located at left of steering column. Connect ohmmeter leads to terminals of START switch, and note ohmmeter indication while depressing START switch.

If ohmmeter indicates more than 0.1 ohm, replace START switch (para 2-28b).

3. STARTER CRANKS CONTINUOUSLY

Step 1. Connect voltmeter leads to S terminal of starter solenoid and ground, and turn IGNITION switch to ON.

a. If voltmeter indicates zero volts, replace starter assembly (para 2-27a).

b. If voltmeter indicates 24 Vdc, proceed to step 2.

Step 2. Connect voltmeter leads to terminal 1 of starter relay and ground, and turn IGNITION switch to ON.

a. If voltmeter indicates 24 Vdc, replace START switch (para 2-28b).

b. If voltmeter does not indicate 24 Vdc, replace starter relay (para 2-27b).

2-22. CHARGING SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ABNORMAL ALTERNATOR LIGHT OPERATION

Step 1. Place IGNITION switch to OFF. ALTERNATOR light should be off.

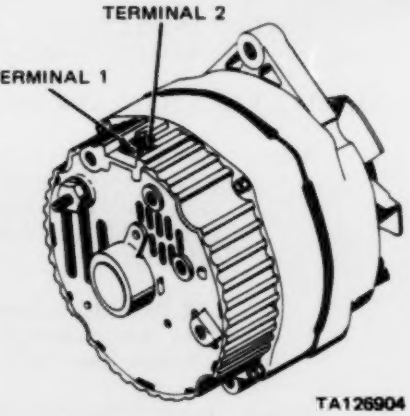
a. If ALTERNATOR light is off, proceed to step 2.

2-22. CHARGING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ABNORMAL ALTERNATOR LIGHT OPERATION (cont)

STEP 1. (cont)



b. If ALTERNATOR light is on, grasp and pull connector from alternator terminals 1 and 2. If the ALTERNATOR light goes out, replace the alternator (para 2-26).
If the light stays on, check for a short between these wires, then install connector on alternator terminals 1 and 2.

Step 2. Place IGNITION switch to ON with engine stopped. ALTERNATOR light should be on. With engine running, ALTERNATOR light should be off.

a. If ALTERNATOR light is off with engine stopped, or on with engine running, check for an open circuit between alternator terminal 1 and ALTERNATOR light. Use an ohmmeter to check diode and 40 ohm resistor in ALTERNATOR light circuit.

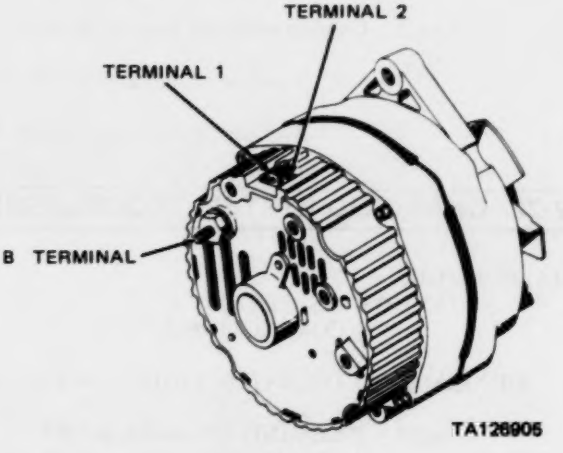
b. If circuit tests are satisfactory, troubleshoot alternator (MALFUNCTION 2 below).

2. ALTERNATOR OUTPUT LOW, UNSTEADY OR ZERO

Step 1. Turn IGNITION switch to ON and alternately connect voltmeter leads from ground to alternator terminal 1, terminal 2 and B terminal.

a. If voltmeter indicates 24 Vdc at all three terminals, proceed to step 2.

b. If voltmeter does not indicate 24 Vdc at one or more terminals, check for an open circuit between battery positive post and affected alternator terminal.



Step 2. Disconnect battery ground cable and connect an ammeter between alternator B terminal and starter relay terminal 3.
Reconnect battery ground cable, and connect a carbon pile across batteries. Turn all vehicle lights on to increase load on batteries, and operate engine at 1800 rpm.

a. If ammeter indicates 27 to 47 amperes, but ALTERNATOR light stays on, check for open circuit from alternator terminal 1 in wiring, diode, and 40 ohm resistor.

b. If ammeter does not indicate 27 to 47 amperes, replace alternator (para 2-26).

2-23. HORN AND BACK-UP ALARM SYSTEM TROUBLESHOOTING

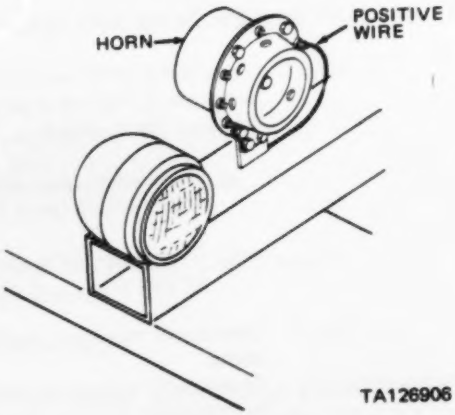
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. HORN DOES NOT SOUND

Step 1. Disconnect positive wire from side of horn. Connect positive voltmeter lead to connector on positive wire, and negative voltmeter lead to vehicle ground.

a. If voltmeter indicates 24 Vdc, reconnect positive wire to side of horn and proceed to step 2.

b. If voltmeter does not indicate 24 Vdc, troubleshoot 25 ampere circuit breaker (para 2-21, malfunction entry 2, step 6). If 25 ampere circuit breaker test is satisfactory, check for open circuit in wiring between battery positive post and connector on horn positive wire.



TA126906

Step 2. Disconnect horn button wire from bottom of horn. Temporarily connect jumper wire from terminal on bottom of horn to vehicle ground.

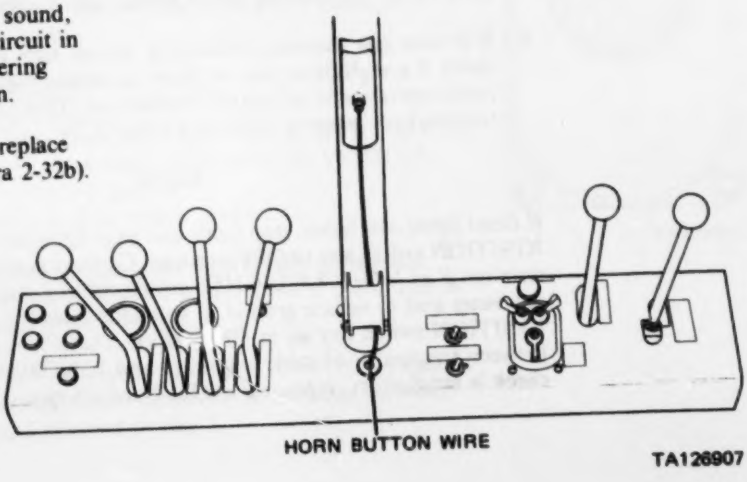
a. If horn sounds, reconnect horn button wire to bottom of horn and proceed to step 3.

b. If horn does not sound, replace horn (para 2-32a).

Step 3. Disconnect horn button wire from terminal on steering column. Temporarily connect jumper wire from connector on horn button wire to vehicle ground.

a. If horn does not sound, check for open circuit in wire between steering column and horn.

b. If horn sounds, replace horn switch (para 2-32b).

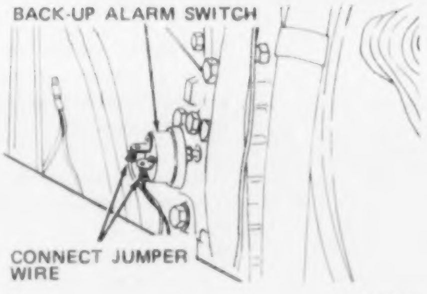


TA126907

2-23. HORN AND BACK-UP ALARM SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. BACK-UP ALARM DOES NOT SOUND

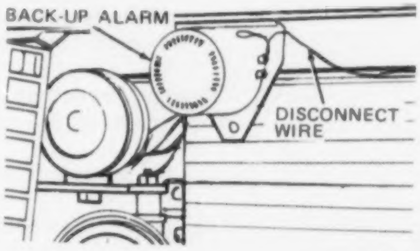


TA126908

Step 1. Turn IGNITION switch key to ON position and temporarily connect a jumper wire to terminals of back-up alarm switch.

a. If back-up alarm sounds, replace back-up alarm switch (para 2-31b).

b. If back-up alarm does not sound, proceed to step 2.



TA126909

Step 2. Disconnect wire from positive terminals of back-up alarm.
Temporarily connect a jumper wire between positive battery cable and positive terminal of back-up alarm.

a. If back-up alarm sounds, reconnect wire to positive alarm terminal and proceed to step 3.

b. If back-up alarm does not sound, connect a jumper wire to vehicle ground and back-up alarm negative terminal. If alarm does not sound with ground jumper at negative terminal and battery positive jumper at positive terminal, replace back-up alarm (para 2-32c).

Step 3. Turn and hold IGNITION switch key at LAMP TEST position.

a. If at least one warning indicator (TRANSMISSION TEMPERATURE, HYDRAULIC FILTER, or ENGINE TEMPERATURE) is on, check for open circuit in wiring between back-up alarm, back-up alarm switch, and 6 ampere circuit breaker.

b. If at least one warning indicator is not on, turn IGNITION switch key to ON position and check if a slight buzz can be heard at electric fuel pump. If slight buzz indicating electric fuel pump operation is not heard, troubleshoot IGNITION switch (para 2-25). If slight buzz is heard, troubleshoot warning indicators (para 2-25).

NOTE

If flood lights, tail lights, stop lights and gage lights are all inoperative, turn IGNITION switch key to OFF position. Connect positive voltmeter lead to terminal F of VEHICLE LIGHTS switch cable connector and negative voltmeter lead to vehicle ground. If voltmeter does not indicate 24 Vdc with IGNITION switch key set at ON position, check for open circuit in wiring between terminal F of cable connector and IGNITION switch. If wiring check is satisfactory, replace IGNITION switch (para 2-28c).

2-24. LIGHT SYSTEMS TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. FRONT FLOOD LIGHTS INOPERATIVE

NOTE

If one or more front flood light operates normally, replace bulb in affected flood light (para 2-30a). If flood light is still inoperative, check for open circuit in wire between inoperative flood light and FRONT FLOOD switch.

Step 1. Turn IGNITION switch to OFF and remove key.
Disconnect 10 ampere circuit breaker wire from terminal on FRONT FLOOD switch.
Connect ohmmeter leads to leads of 10 ampere circuit breaker.

a. If ohmmeter indicates less than 0.1 ohm, proceed to step 2.

b. If ohmmeter indicates more than 0.1 ohm, connect ohmmeter leads to vehicle ground and 4-wire terminal of FRONT FLOOD switch. If ohmmeter indicates less than 2 ohms, check for short in wiring between FRONT FLOOD switch and front flood lights. Replace 10 ampere circuit breaker after short is removed (para 2-28a).

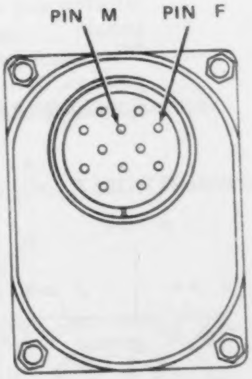
Step 2. Connect ohmmeter leads to terminals of FRONT FLOOD switch and set FRONT FLOOD switch at ON position.

a. If ohmmeter indicates less than 0.1 ohm, reconnect lead of 10 ampere circuit breaker to terminal of FRONT FLOOD switch and proceed to step 3.

b. If ohmmeter indicates more than 0.1 ohm, replace FRONT FLOOD switch (para 2-28a).

Step 3. Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever on VEHICLE LIGHTS switch in SER. DRIVE position.
Connect ohmmeter leads to pins F and M of VEHICLE LIGHTS switch.

If ohmmeter indicates more than 0.1 ohm, replace VEHICLE LIGHTS switch (para 2-28b).



TA126910

2. FRONT BLACK OUT LIGHT INOPERATIVE

Step 1. Unplug wire connector from front black out terminal. Set IGNITION switch to ON position and place main switch lever on VEHICLE LIGHTS switch in B.O. DRIVE position.
Connect positive voltmeter lead to vehicle ground.

a. If voltmeter indicates 24 Vdc, place IGNITION switch and VEHICLE LIGHTS switch in OFF position and place bulb in front black out light (para 2-30b).

b. If voltmeter does not indicate 24 Vdc, place IGNITION switch in OFF position, reconnect wire connector to terminal on front black out light, and proceed to step 2.

2-24. LIGHT SYSTEMS TROUBLESHOOTING (cont)

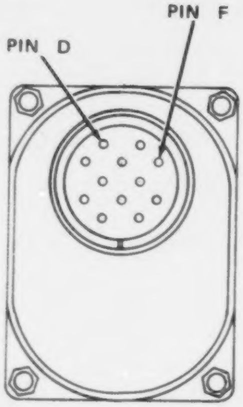
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. FRONT BLACK OUT LIGHT INOPERATIVE (cont)

Step 2. Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch. With main switch lever on VEHICLE LIGHTS switch in B.O. DRIVE position, connect ohmmeter leads to pins D and F of VEHICLE LIGHTS switch.

a. If ohmmeter indicates more than 0.1 ohm, replace VEHICLE LIGHTS switch (para 2-28b).

b. If ohmmeter indicates less than 0.1 ohm, check for open circuit in wire between terminal D of cable connector and front black out light.



TA126911

3. BLACK OUT TAIL LIGHTS INOPERATIVE

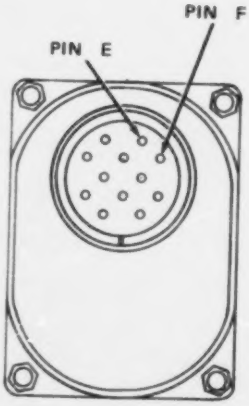
NOTE

If one black out tail light operates normally, replace bulb in affected tail light (para 2-30c). If tail light is still inoperative, check for open circuit in wire between inoperative tail light and operating tail light.

Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever on VEHICLE LIGHTS switch in SER. DRIVE position.
Connect ohmmeter leads to pins E and F of VEHICLE LIGHTS switch.

a. If ohmmeter indicates more than 0.1 ohm, replace VEHICLE LIGHTS switch (para 2-28b).

b. If ohmmeter indicates less than 0.1 ohm, check for open circuit in wire between terminal E of cable connector and black out tail lights.



TA126912

2-24. LIGHT SYSTEMS TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. SERVICE TAIL LIGHTS INOPERATIVE

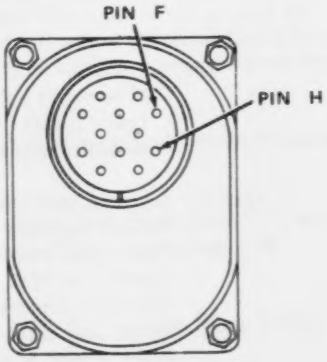
NOTE

If one service tail light operates normally, replace bulb in affected tail light (para 2-30d). If tail light is still inoperative, check for open circuit in wire between inoperative tail light and operating tail light.

Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever on VEHICLE LIGHTS switch in SER. DRIVE position.
Connect ohmmeter leads to pins H and F of VEHICLE LIGHTS switch.

a. If ohmmeter indicates more than 0.1 ohm, replace VEHICLE LIGHTS switch (para 2-28b).

b. If ohmmeter indicates less than 0.1 ohm, check for open circuit in wire between terminal H of cable connector and service tail lights.



TA126913

5. BLACK OUT STOP LIGHTS INOPERATIVE

NOTE

If one stop light operates normally, replace bulb in affected stop light (para 2-30c). If stop light is still inoperative, check for open circuit in wire between inoperative stop light and operating stop light.

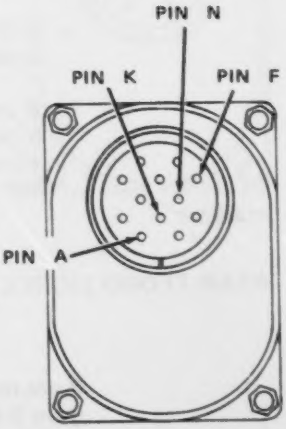
Step 1. Place IGNITION switch in ON position, VEHICLE LIGHTS switch in SER. DRIVE position, and depress brake pedal.

a. If service brake lights operate normally, turn IGNITION switch and VEHICLE LIGHTS switch to OFF position and proceed to step 2.

b. If service brake lights are inoperative, troubleshoot stop light switch (para 2-24, MALFUNCTION 6).

Step 2. Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever on VEHICLE LIGHTS switch in B.O. MARKER or B.O. DRIVE position.
Connect ohmmeter leads to pins A and F of VEHICLE LIGHTS switch and check for less than 0.1 ohm, then connect ohmmeter leads to pins K and N and check for less than 0.1 ohm.

a. If ohmmeter indicates more than 0.1 ohm for either test, replace VEHICLE LIGHTS switch (para 2-28b).



TA126914

2-24. LIGHT SYSTEMS TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. BLACK OUT STOP LIGHTS INOPERATIVE (cont)

Step 2. (cont)

b. If ohmmeter indicates less than 0.1 ohm for both tests, check for open circuit in wire between terminal N of cable connector and black out stop lights.

6. SERVICE STOP LIGHTS INOPERATIVE

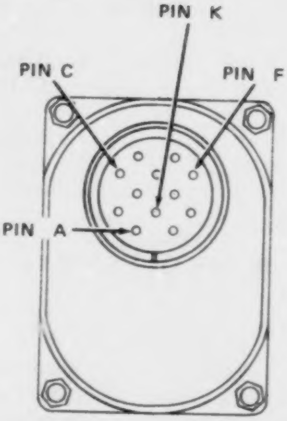
NOTE

If one stop light operates normally, replace bulb in affected stop light (para 2-30d). If stop light is still inoperative, check for open circuit in wire between inoperative stop light and operating stop light.

Step 1. Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever on VEHICLE LIGHTS switch in STOP LIGHT or SER. DRIVE position.
Connect ohmmeter leads to pins A and F of VEHICLE LIGHTS switch and check for less than 0.1 ohm, then connect ohmmeter leads to pins K and C and check for less than 0.1 ohm.

a. If ohmmeter indicates more than 0.1 ohm for either test, replace VEHICLE LIGHTS switch (para 2-28b).

b. If ohmmeter indicates less than 0.1 ohm for both tests, check for open circuit in wire between terminal C of cable connector and service stop lights. If continuity test of wire is satisfactory, proceed to step 2.

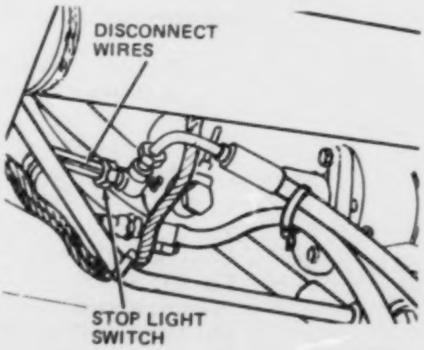


TA126915

Step 2. Disconnect wires from stop light switch and connect ohmmeter leads to terminals of stop light switch. Note ohmmeter indication while an assistant depresses brake pedal.

a. If ohmmeter does not indicate less than 0.2 ohm, replace stop light switch (para 2-31e(2)).

b. If ohmmeter indicates less than 0.2 ohm with brake pedal depressed, check for open circuit in wiring between stop light switch and terminals A and K of cable connector.



TA126916

7. REAR FLOOD LIGHTS INOPERATIVE

NOTE

If one rear flood light operates normally, replace bulb in affected flood light (para 2-30a). If flood light is still inoperative, check for open circuit in wire between inoperative flood light and REAR FLOOD switch.

2-24. LIGHT SYSTEMS TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. REAR FLOOD LIGHTS INOPERATIVE (cont)

Step 1. Turn IGNITION switch to OFF and remove key.
Disconnect 6 ampere circuit breaker wire from terminal on REAR FLOOD switch.
Connect ohmmeter leads to leads of 6 ampere circuit breaker.

a. If ohmmeter indicates less than 0.1 ohm, proceed to step 2.

b. If ohmmeter indicates more than 0.1 ohm, connect ohmmeter leads to vehicle ground and wire on terminal of REAR FLOOD switch. If ohmmeter indicates less than 4.5 ohms, check for short in wiring between REAR FLOOD switch and rear flood lights. Replace 6 ampere circuit breaker after short is removed (para 2-28a).

Step 2. Connect ohmmeter leads to terminals of REAR FLOOD switch and set REAR FLOOD switch at ON position.

a. If ohmmeter indicates less than 0.1 ohm, reconnect lead of 6 ampere circuit breaker to terminal of REAR FLOOD switch and troubleshoot VEHICLE LIGHTS switch (para 2-24, MALFUNCTION 1).

b. If ohmmeter indicates more than 0.1 ohm, replace REAR FLOOD switch (para 2-28a).

8. GAGE LIGHTS INOPERATIVE

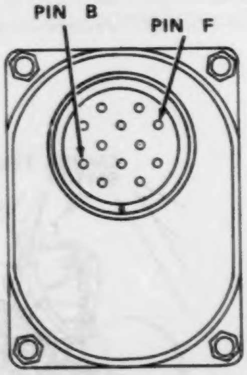
NOTE

If one gage light operates normally, replace bulb in affected gage light (para 2-18a). If gage light is still inoperative, check for open circuit in wire between inoperative gage light and operating gage light.

Unscrew and remove cable connector from bottom of VEHICLE LIGHTS switch.
Place main switch lever in any position other than OFF, and place auxiliary switch lever in PARK or DIM position.
Connect ohmmeter leads to pins B and F of VEHICLE LIGHTS switch and check for 20 to 30 ohms indication on ohmmeter, then place auxiliary switch lever in PANEL BRT. position and check for less than 0.1 ohm indication on ohmmeter.

a. If ohmmeter indicates more than 0.1 ohm in PANEL BRT. position, or does not indicate 20 to 30 ohms in PARK and DIM positions, replace VEHICLE LIGHTS switch (para 2-28b).

b. If VEHICLE LIGHTS switch resistance tests are satisfactory, check for open circuit in wire or 40 ohm resistor between terminal B of cable connector and gage lights.



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2-25. INSTRUMENT PANEL TROUBLESHOOTING

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

NOTE

Refer to paragraph 2-13 for OIL PRESSURE gage and FUEL LEVEL gage troubleshooting, and paragraph 2-22 for ALTERNATOR warning light troubleshooting. Other switches and lights are covered in the paragraphs that cover the systems of which they are a part.

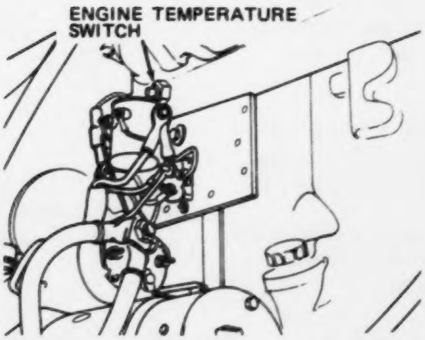
1. WARNING LIGHTS INOPERATIVE

Step 1. Turn and hold IGNITION switch key at LAMP TEST position.

a. If at least one warning indicator (ENGINE TEMPERATURE, TRANSMISSION TEMPERATURE, or HYDRAULIC FILTER) is on, check for open circuit in wiring, connector, or isolation diode between inoperative warning light and IGNITION switch. If circuit check is satisfactory, replace warning light (para 2-28e).

b. If at least one warning indicator is not on, turn IGNITION switch key to ON position and check if a slight buzz can be heard at electric fuel pump. If slight buzz indicating electric fuel pump operation is not heard, troubleshoot IGNITION switch (para 2-25, MALFUNCTION 2). If slight buzz is heard, check for open circuit in wiring between TRANSMISSION TEMPERATURE warning light and 6 ampere circuit breaker. If circuit check is satisfactory, proceed to step 2.

Step 2. Disconnect wires from engine temperature, transmission temperature, oil pressure and hydraulic filter switches.
Temporarily connect a jumper from each wire to vehicle ground and turn IGNITION switch key to ON position.
ENGINE TEMPERATURE, TRANSMISSION TEMPERATURE, OIL PRESSURE and HYDRAULIC FILTER warning lights should be on.



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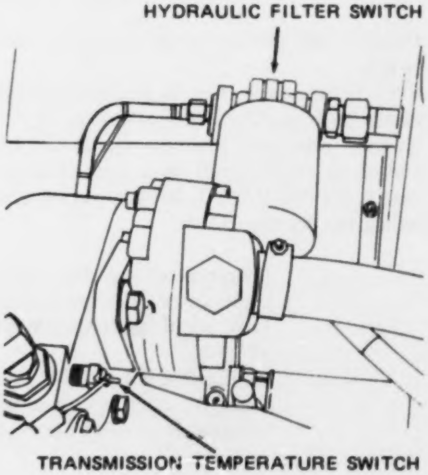

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2-25. INSTRUMENT PANEL TROUBLESHOOTING (cont)

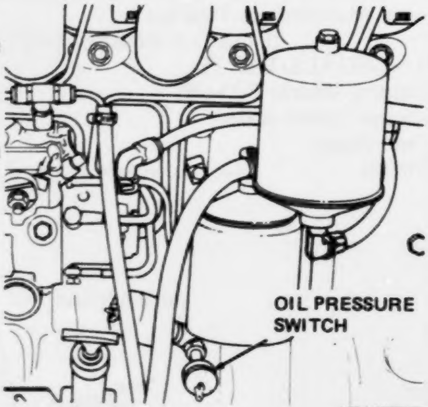
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. WARNING LIGHTS INOPERATIVE (cont)

Step 2. (cont)

a. If warning light is on during test, and inoperative during high temperature or low oil pressure vehicle operation, replace associated warning light switch (para 2-28e).

b. If warning light is not on, check for open circuit in wiring or 40 ohm resistor between inoperative warning light and associated warning light switch.



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2. WARNING LIGHTS, BACK-UP ALARM AND ELECTRIC FUEL PUMP INOPERATIVE

Turn IGNITION switch key to ON position and depress START switch.

a. If starter cranks engine, replace 6 ampere circuit breaker at IGN terminal of IGNITION switch.

b. If starter does not crank engine, connect voltmeter leads to BATT terminal of IGNITION switch and vehicle ground. If voltmeter indicates 24 Vdc, replace IGNITION switch (para 2-28c). If voltmeter does not indicate 24 Vdc, check for open circuit in wiring between IGNITION switch BATT terminal and 25 ampere circuit breaker.

2-26. ALTERNATOR MAINTENANCE

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Testing

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

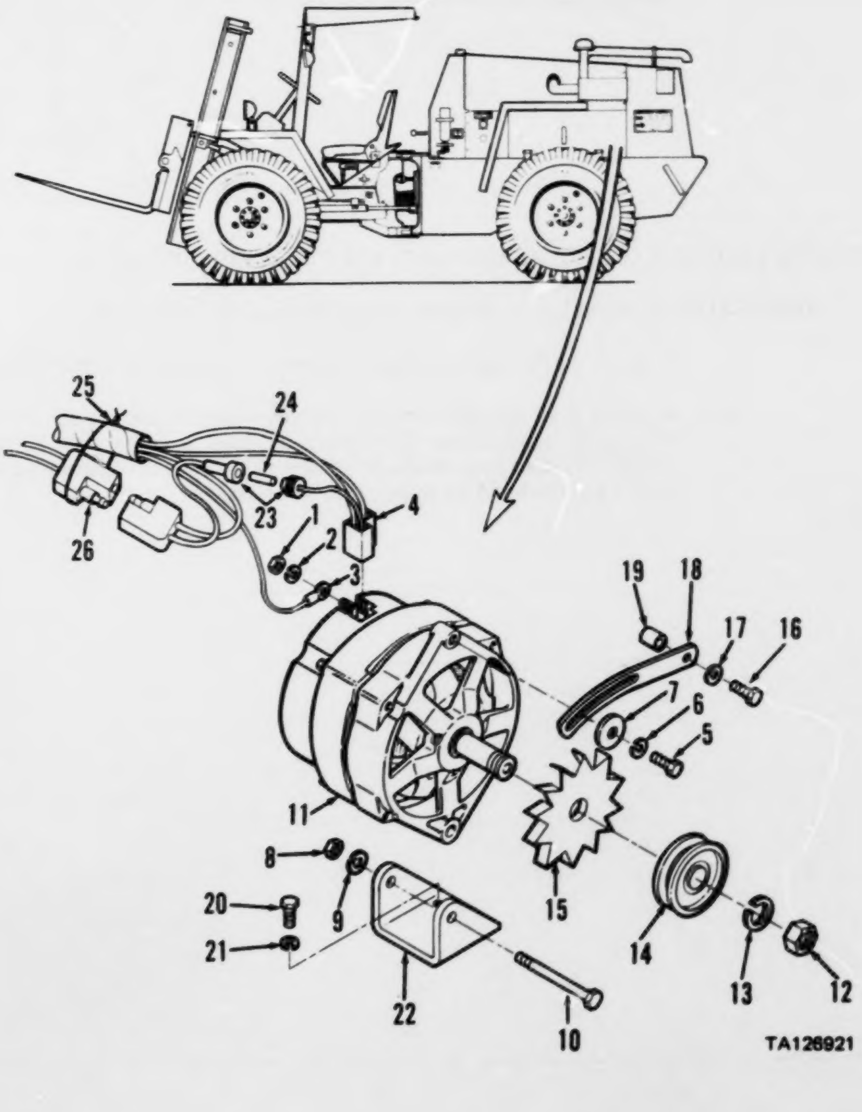
Cleaning solvent P-D-680
Silicone rubber sealer
Clean cloths
Wire tie

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.
2-17f	Alternator belt removed.
2-33b	Battery ground cable disconnected.

Key

1. Nut
2. Lock washer
3. Wire lead
4. Connector
5. Cap screw
6. Lock washer
7. Washer
8. Nut
9. Lock washer
10. Cap screw
11. Alternator
12. Nut
13. Lock washer
14. Pulley
15. Fan
16. Cap screw
17. Lock washer
18. Strap
19. Spacer
20. Cap screw
21. Lock washer
22. Bracket
23. In-line retainer
24. Resistor
25. Tie strap
26. Diode



2-26. ALTERNATOR MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear, left side of vehicle	a. Nut (1), lock washer (2) and wire lead (3)	Remove	From BATT terminal
		b. Push-on connector (4)	Grasp and disconnect	From terminals 1, 2 and R
		c. Cap screw (5), lock washer (6) and washer (7)	Remove	
		d. Nut (8), lock washer (9) and cap screw (10)	Remove	Support alternator (11)
		e. Alternator (11)	Remove	
2	Alternator	Nut (12), lock washer (13), pulley (14) and fan (15)	Remove	Use pulley puller
3	Engine compartment rear left side of vehicle	a. Cap screw (16), lock washer (17), strap (18) and spacer (19)	Remove	From engine
		b. Cap screw (20), lock washer (21) and bracket (22)	Remove	From engine
		c. Retainer halves (23)	Push together, turn and separate	Remove resistor (24)
		d. Tie strap (25)	Cut and remove	From harness and diode (26)
		e. Diode (26)	Unplug and remove	
CLEANING				

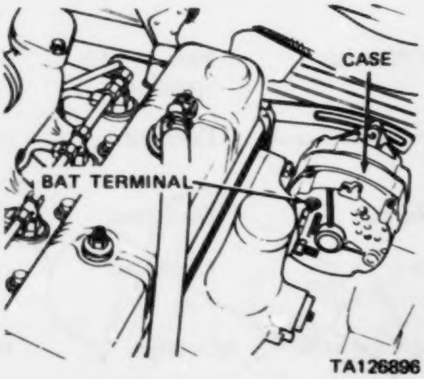
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-26. ALTERNATOR MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		Pulley (14), fan (15), strap (18), and bracket (22)	Clean	Use cleaning solvent P-D-680 and stiff bristled brush. Dry thoroughly with compressed air
5		All hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
6		Fan (15)	Inspect	Replace if cracked or damaged, or if fins bent or broken
7		Pulley (14), strap (18) and bracket (22)	Inspect	Replace if cracked, damaged or worn
8		All hardware	Inspect	Replace if worn, or if threads damaged
9		Diode (26)	Test	Set ohmmeter to lowest resistance range, and connect leads to terminals of diode. Note reading, then reverse leads and note reading. There should be one low and one high reading. Replace if readings are both low, both high, or identical
INSTALLATION/REPLACEMENT				
10	Alternator	a. Fan (15) and pulley (14)	Position	On shaft
		b. Lock washer (13) and nut (12)	Install	Tighten to 40-60 pounds foot torque
11	Engine compartment rear, left side of vehicle	a. Diode (26)	Plug in	
		b. Tie strap (25)	Loop and tie	Around harness and diode (26)
		c. Bracket (22)	Position	On engine
		d. Lock washer (21) and cap screw (20)	Install and tighten	
		e. Spacer (19) and strap (18)	Position	On engine
		f. Lock washer (17) and cap screw (16)	Install	Tighten hand-tight only
		g. Alternator (11)	Position	On bracket (22)

2-26. ALTERNATOR MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
11 (cont)		h. Cap screw (10), lock washer (9) and nut (8)	Install	Tighten hand-tight only
		i. Cap screw (5), lock washer (6) and washer (7)	Install	Tighten hand-tight only
		j. Alternator and fan belt	Adjust	Para 2-17f
		k. Cap screw (5), nut (8) and cap screw (16)	Tighten	When proper adjustment of alternator and fan belt is obtained
		l. Wire lead (3), lock washer (2) and nut (1)	Install	On BATT terminal of alternator
		m. Push-on connector (4)	Connect	To alternator terminals 1, 2 and R
		n. BATT terminal of alternator	Seal	Use silicone rubber sealer
		o. Resistor (24)	Position	In retainer halves (23)
		p. Retainer halves (23)	Push together and turn clockwise	To secure resistor (24)
TESTING				
12	Engine compartment, rear, left side of vehicle	Voltmeter	Connect	To alternator BAT terminal and case ground
		 TA126896		
13	Operator's compartment	a. IGNITION switch	Place in ON position	
		b. START switch	Depress and start engine	Operate engine at 1800 RPM with all accessories off
14	Engine compartment	Voltmeter	Observe	Voltmeter should indicate no more than 31 Vdc with engine operating at 1800 RPM; if indication is more than 31 Vdc, replace alternator

2-26. ALTERNATOR MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
15	Operator's compartment	IGNITION switch	Place in OFF position	
16	Battery compartment, rear of vehicle	Battery ground cable	Disconnect	Paragraph 2-33b
17	Engine compartment	Ammeter	Connect	Between alternator BAT terminal and starter relay terminal 3
18	Battery compartment, rear of vehicle	a. Battery ground cable	Connect	Paragraph 2-33b
		b. Carbon pile	Connect	Across batteries
19	Operator's compartment	a. IGNITION switch	Place in ON position	
		b. START switch	Depress	Start and operate engine at 1800 RPM; turn all vehicle lights on to increase load on batteries
20	Engine compartment	Ammeter	Observe	Ammeter should indicate 27 to 47 amperes with engine operating at 1800 RPM; if ammeter does not indicate 27 to 40 amperes, replace alternator
21	Operator's compartment	IGNITION switch	Place in OFF position	Turn all vehicle lights off
22	Battery compartment, rear of vehicle	a. Battery ground cable	Disconnect	Paragraph 2-33b
		b. Carbon pile	Disconnect	From batteries
23	Engine compartment	Ammeter	Disconnect	
24	Battery compartment, rear of vehicle	Battery ground cable	Connect	Paragraph 2-33b

2-27. STARTING SYSTEM MAINTENANCE

a. Starter.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Testing
e. Installation/Replacement

INITIAL SETUP

TOOLS

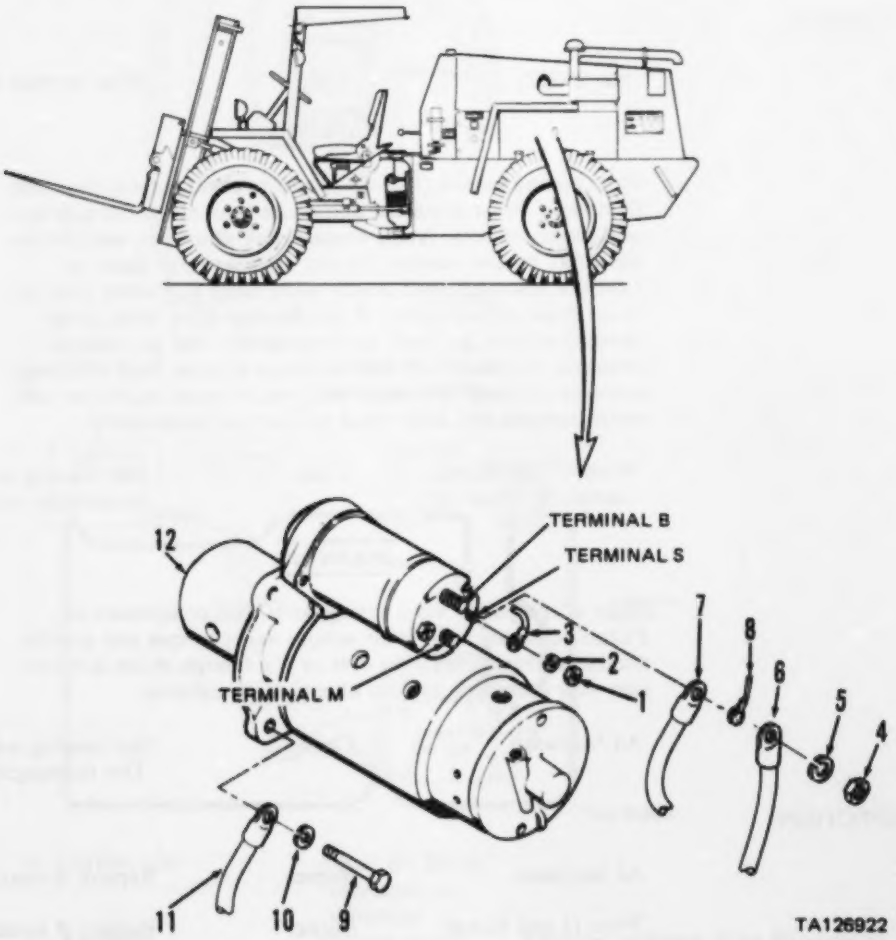
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.
2-33b	Battery ground cable disconnected.



KEY
1. Nut
2. Lock washer
3. Wire
4. Nut
5. Lock washer
6. Cable
7. Cable
8. Wire
9. Cap screws
10. Lock washers
11. Ground cable
12. Starter

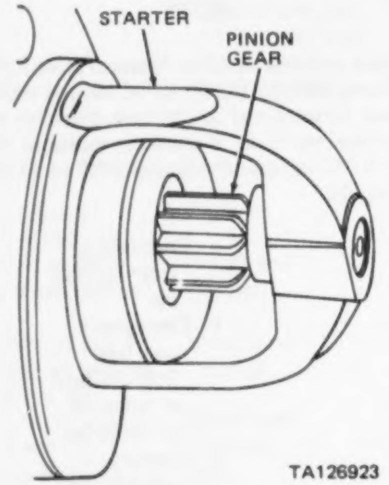
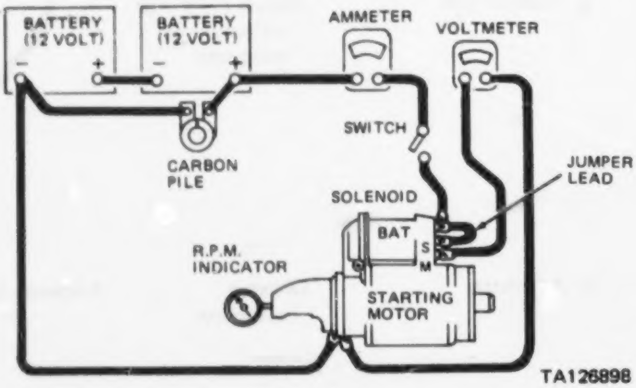
2-27. STARTING SYSTEM MAINTENANCE (cont)

a. Starter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear, left side of vehicle	a. Nut (1), lock washer (2) and wire (3)	Remove	From solenoid switch S terminal
		b. Nut (4), lock washer (5), two cables (6 and 7) and wire (8)	Remove	From solenoid switch B terminal
		c. Three cap screws (9), lock washers (10) and ground cable (11)	Remove	Support starter (12)
		d. Starter (12)	Remove	From engine
CLEANING				
2		Starter (12)	Clean	Wipe exterior with clean, dry cloth
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		Wires (3 and 8) and cables (6, 7 and 11)	Clean	Use cleaning solvent P-D-680 on connectors only
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		All hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
5		All hardware	Inspect	Replace if worn, or if threads damaged
6		Wires (3 and 8) and cables (6, 7 and 11)	Inspect	Replace if insulation frayed, or if conductors broken

2-27. STARTING SYSTEM MAINTENANCE (cont)

a. Starter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
7		Starter (12)	Inspect	Replace if pinion gear teeth chipped, damaged or excessively worn
		 STARTER PINION GEAR TA126923		
TESTING				
8	Test bench	a. Starter	Connect to test setup as shown	
		 BATTERY (12 VOLT) – + BATTERY (12 VOLT) – + AMMETER VOLTMETER SWITCH CARBON PILE JUMPER LEAD SOLENOID BAT S M R.P.M. INDICATOR STARTING MOTOR TA126898		
		b. Carbon pile	Adjust for 20 Vdc indication on voltmeter	
		c. Ammeter	Observe indication	Ammeter indicates 52 to 90 amperes

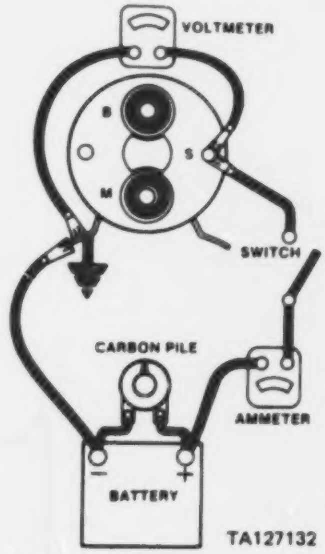
2-27. STARTING SYSTEM MAINTENANCE (cont)

a. Starter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
8 (cont)		d. RPM indicator	Observe indication	RPM indicator indicates 8000 to 13,000 RPM

NOTE

If ammeter does not indicate 52 to 90 amperes, or RPM indicator does not indicate 8000 to 13,000 RPM, record voltage, current and RPM, and forward test results with defective starter to direct support maintenance. If ammeter indicates 52 to 90 amperes and RPM indicator indicates 8000 to 13,000 RPM, proceed to step 8e.

		e. Starter	a. Disconnect from test setup b. Disconnect and tape field coil lead at solenoid M terminal c. Connect solenoid terminals to test setup as shown	 VOLTMETER B S M SWITCH CARBON PILE AMMETER − + BATTERY TA127132
		f. Switch	Close	
		g. Carbon pile	Adjust for 9 Vdc indication on voltmeter	
		h. Ammeter	Observe indication	Ammeter indicates 6.5 to 7.0 amperes

NOTE

If ammeter does not indicate 6.5 to 7.0 amperes, record test results and forward to direct support maintenance with defective starter (solenoid switch defective).

2-27. STARTING SYSTEM MAINTENANCE (cont)

a. Starter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
8 (cont)		i. Starter	Disconnect from test setup; connect field coil lead to solenoid M terminal and install starter (step 9 below)	
INSTALLATION/REPLACEMENT				
9	Engine compartment rear, left side of vehicle	a. Starter (12) and ground cable (11)	Position	
		b. Three lock washers (10) and cap screws (9)	Install and tighten	
		c. Two cables (6 and 7), wire (8), lock washer (5) and nut (4)	Install and tighten	On terminal B of solenoid switch
		d. Wire (3), lock washer (2) and nut (1)	Install and tighten	On terminal S of solenoid switch
		e. Terminals B, M, and S of solenoid switch	Seal	Use silicone rubber sealer

2-27. STARTING SYSTEM MAINTENANCE (cont)

b. Starter Relay and 25 AMP Circuit Breaker.

This task covers:		
	a. Removal	c. Inspection
	b. Cleaning	d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

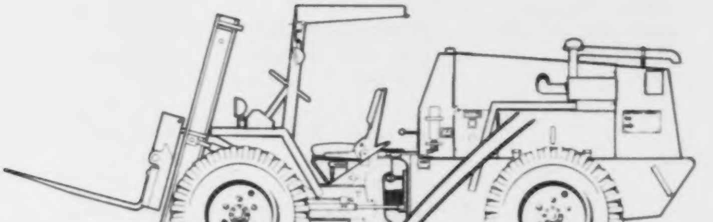
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.
2-33b	Battery ground cable disconnect.

KEY
1. Nut
2. Lock washer
3. Nuts
4. Lock washers
5. Cap screws
6. Lock washers
7. Flat washers
8. Starter relay
9. Nuts
10. Lock washers
11. Nuts
12. Lock washers
13. Screws
14. Circuit breaker (25 amp)
15. Mounting plate



2-27. STARTING SYSTEM MAINTENANCE (cont)

b. Starter Relay and 25 AMP Circuit Breaker (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear, left side of vehicle	a. Nut (1), lock washer (2) and wire	Tag and remove	From relay center terminals
		b. Two nuts (3), lock washers (4) and four wires	Tag and remove	From relay end terminals
		c. Two cap screws (5), lock washers (6) and flat washers (7)	Remove	Support relay (8) and mounting plate (15)
		d. Starter relay (8)	Remove	From mounting plate (15)
		e. Two nuts (9), lock washers (10) and three wires	Tag and remove	From circuit breaker terminals
		f. Two nuts (11), lock washers (12) and screws (13)	Remove	Support circuit breaker (14) and mounting plate (15)
		g. Circuit breaker (14) and mounting plate (15)	Separate	
CLEANING				
2		Starter relay (8) and circuit breaker (14)	Clean	Wipe exterior with clean, dry cloth

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Wire connectors and terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-27. STARTING SYSTEM MAINTENANCE (cont)

b. Starter Relay and 25 AMP Circuit Breaker (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		All hardware and mounting plate	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air.
INSPECTION				
5		All hardware	Inspect	Replace if worn, or if threads damaged
6		Wire	Inspect	Replace if insulation frayed, or if conductors broken
7		Mounting plate (15)	Inspect	Replace if cracked or damaged
INSTALLATION				
8	Engine compartment rear, left side of vehicle	a. Circuit breaker (14)	Position	On mounting plate (15)
		b. Two screws (13), lock washers (12) and nuts (11)	Install and tighten	
		c. Mounting plate (15) and relay (8)	Position	On engine
		d. Two flat washers (7), lock washers (6) and cap screws (5)	Install and tighten	
		e. Three wires, two lock washers (10) and nuts (9)	Install and tighten	On circuit breaker terminals
		f. Four wires, two lock washers (4) and nuts (3)	Install and tighten	On relay end terminals
		g. Wire, lock washer (2) and nut (1)	Install and tighten	On relay center terminal
		h. Relay and circuit breaker terminals	Seal	Use silicone rubber sealer

2-28. INSTRUMENT PANEL MAINTENANCE

a. Flood Light Switches and Circuit Breakers.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

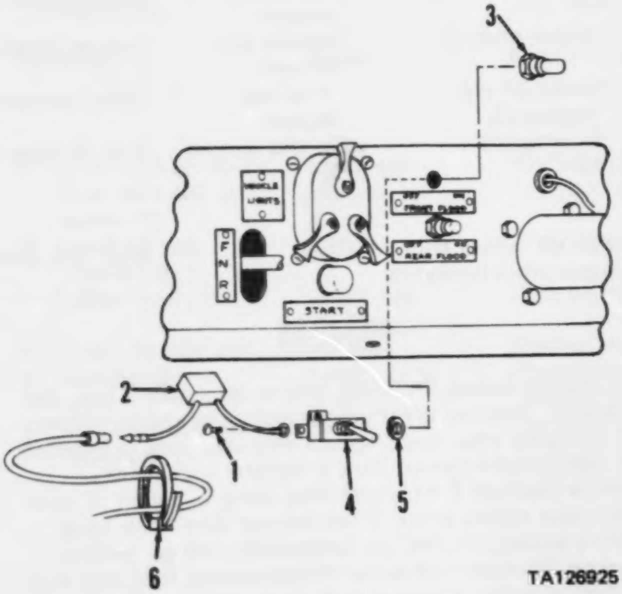
No. 1 Common Organizational Maintenance Tool Kit — NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Tie strap
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53h	Noise baffle mat removed.


3
VEHICLE LIGHTS
F
N
R
START
OFF ON
FRONT FLOOD
OFF ON
REAR FLOOD
2
1
4
5
6

TA126925

KEY
1. Screws
2. Circuit breaker
3. Boot
4. Switch
5. Washer
6. Tie strap

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

a. Flood Light Switches and Circuit Breakers (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

NOTE

6 ampere circuit breaker connects to REAR FLOOD switch.
10 ampere circuit breaker connects to FRONT FLOOD switch.

REMOVAL

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Instrument panel, left of steering column	a. Wire leads	Tag	On switch (4)
		b. Two screws (1) and wire leads	Remove	From switch
		c. Circuit breaker (2)	Unplug and remove	From harness lead
		d. Rubber boot (3)	Unscrew and remove	Support switch (4)
		e. Switch (4) and washer (5)	Lower and remove	From instrument panel
		f. Tie strap (6)	Cut and remove	From harness wire

CLEANING

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Switch (4), rubber boot (3) and circuit breaker (2)	Clean	Wipe with clean, dry cloth

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Switch terminals and wire connectors	Clean	Use cleaning solvent P-D-680 on terminals and connectors only

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

a. Flood Light Switches and Circuit Breakers (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		Screws (1)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
5		Rubber boot (3)	Inspect	Replace if threads damaged, or if boot cracked or deteriorated
6		Harness and circuit breaker wires	Inspect	Replace if insulation frayed, or if conductors broken
7		Switch (4)	Inspect	Replace if threads or terminals damaged
INSTALLATION				
8	Instrument panel, left of steering column	a. Circuit breaker lead, wire leads and two screws (1)	Install and tighten	Note tags for connection
		b. Switch (4) and washer (5)	Position	In instrument panel
		c. Rubber boot (3)	Install and tighten	Until switch (4) is securely mounted
		d. Circuit breaker lead	Push in	Harness lead
		e. Tie strap (6)	Loop and tie	Around harness wire (to prevent circuit breaker from hanging)
		f. Wire leads and switch terminals	Seal	Use silicone rubber sealer

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

b. START Switch and VEHICLE LIGHTS Switch.

This task covers: a. Removal b. Cleaning c. Inspection d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

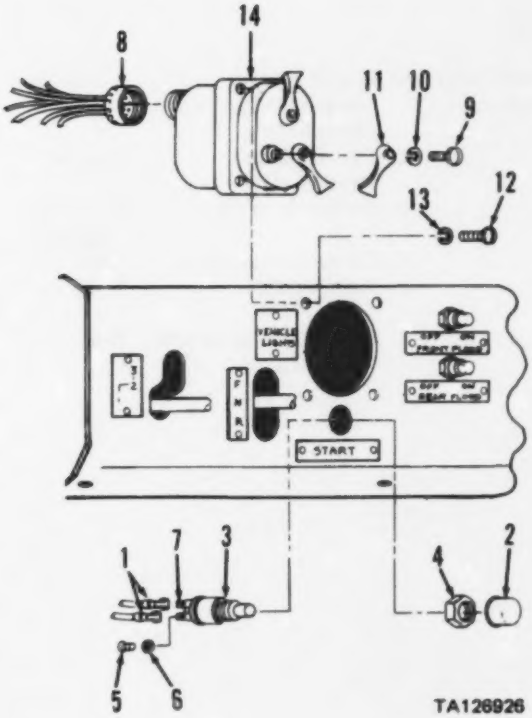
Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53h	Noise baffle mat removed.

KEY

1. Wire leads
2. Boot
3. START switch
4. Nut
5. Screws
6. Washers
7. Terminal blades
8. Harness connector
9. Screws
10. Lock washers
11. Levers
12. Screws
13. Lock washers
14. VEHICLE LIGHTS switch


14
8
11
10
9
12
13
VEHICLE LIGHTS
OFF ON FRONT FLOOD
OFF ON REAR FLOOD
F N R
START
1
7
3
4
2
5
6

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2-28. INSTRUMENT PANEL MAINTENANCE (cont)

b. START Switch and VEHICLE LIGHTS Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel, left of steering column	a. Wire leads (1)	Grasp and disconnect	From START switch
		b. Rubber boot (2)	Unscrew and remove	Support START switch
		c. START switch (3)	Lower and remove	From instrument panel
		d. Nut (4), two screws (5), washers (6) and terminals (7)	Remove	From START switch
		e. Harness connector (8)	Unscrew and disconnect	From VEHICLE LIGHTS switch
		f. Three screws (9), lock washers (10) and lever (11)	Remove	
		g. Four screws (12) and lock washers (13)	Remove	Support VEHICLE LIGHTS switch
		h. VEHICLE LIGHTS switch (14)	Lower and remove	From instrument panel
CLEANING				
2		Switches (3 and 14), rubber boot (2) and harness connector (8)	Clean	Wipe with clean, dry cloth

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Switch terminals and wire connectors	Clean	Use cleaning solvent P-D-680 on terminals and connectors only

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

b. START Switch and VEHICLE LIGHTS Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		All hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
5		Rubber boot (2)	Inspect	Replace if threads damaged, or if boot cracked or deteriorated
6		Harness and START SWITCH wires	Inspect	Replace if insulation frayed, or if conductors broken
7		Switches (3 and 14)	Inspect	Replace if threads or terminals damaged
8		Terminal blades (7)	Inspect	Replace if broken or corroded
9		All hardware	Inspect	Replace if worn, or if threads damaged
INSTALLATION				
10	Instrument panel, left of steering column	a. VEHICLE LIGHTS switch (14)	Position	In instrument panel
		b. Four screws (12) and lock washers (13)	Install and tighten	Until VEHICLE LIGHTS switch (14) is securely mounted
		c. Three levers (11)	Position	On shafts of VEHICLE LIGHTS switch (14)
		d. Three screws (9) and and lock washers (10)	Install and tighten	Until levers (11) are securely mounted
		e. Harness connector (8)	Install and tighten	On VEHICLE LIGHTS switch (14)
		f. Hex nut (4)	Install and position	For 1/8 inch of START switch threads above instrument panel
		g. Two screws (5), washers (6) and terminals (7)	Install and tighten	On START switch (3)
		h. START switch (3)	Position	In instrument panel
		i. Rubber boot (2)	Install and tighten	Until START switch (3) is securely mounted
		j. Wire leads (1)	Push on	To terminals (7)
		k. Wire leads (1), terminals (7) and harness connector (8)	Seal	Use silicone rubber sealer

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

c. Ignition Switch and Circuit Breaker.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

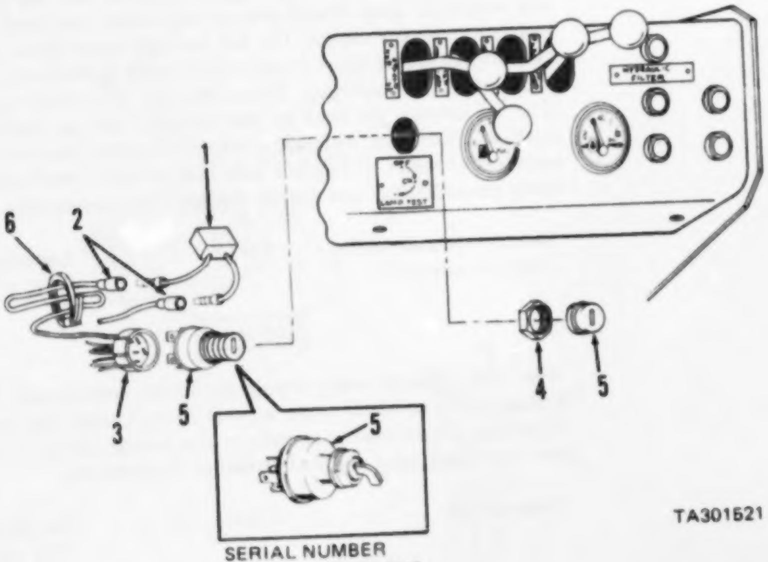
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Tie strap

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.
2-53h	Noise baffle mat removed.



SERIAL NUMBER
9150573 AND ABOVE

KEY
1. Circuit breaker
2. Wire leads
3. Harness connector
4. Hex nut
5. IGNITION switch
6. Tie strap

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel, right of steering column	a. Circuit breaker (1)	Unplug and remove	From wire leads (2)
		b. Harness connector (3)	Grasp and pull	From IGNITION switch (5)
		c. Hex nut (4)	Unscrew and remove	Support IGNITION switch (5)
		d. IGNITION switch (5)	Lower and remove	From instrument panel
		e. Tie strap (6)	Cut and remove	From harness wire

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

c. Ignition Switch and Circuit Breaker (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
2		IGNITION switch (5)	Clean	Wipe with clean, dry cloth
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		Switch terminals and wire connectors	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		Hex nut (4)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air.
INSPECTION				
5		Hex nut (4)	Inspect	Replace if threads damaged
6		Harness and circuit breaker wires	Inspect	Replace if insulation frayed, or if conductors broken
7		IGNITION switch (5)	Inspect	Replace if threads or terminals damaged
INSTALLATION				
8	Instrument panel, right of steering column	a. IGNITION switch (5)	Position	In instrument panel
		b. Hex nut (4)	Install and tighten	Until IGNITION switch (5) is securely mounted
		c. Harness connector (3)	Push on	IGNITION switch terminals
		d. Circuit breaker (1) leads	Push in	Wire leads (2)
		e. Tie strap (6)	Loop and tie	Around wire (to prevent circuit breaker from hanging)

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

d. Lockout Relay.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

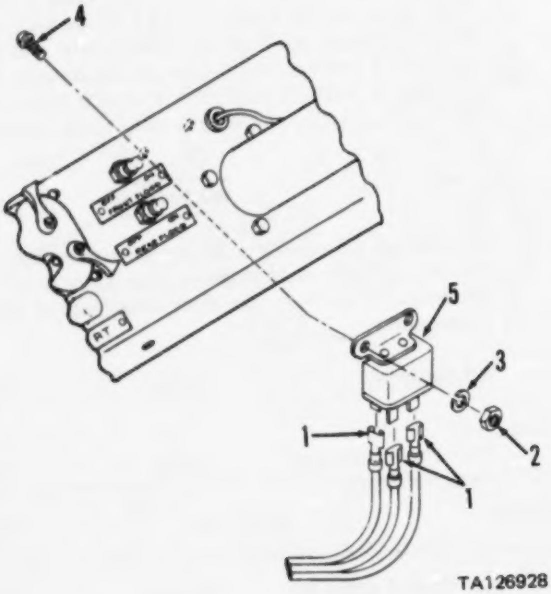
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-53h	Noise baffle mat removed.

KEY
1. Wire leads
2. Nuts
3. Lock washers
4. Cap screws
5. Lockout relay



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STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel, bottom center	a. Wire leads (1)	Tag	
		b. Wire leads (1)	Grasp and pull	From relay terminals
		c. Two nuts (2), lock washers (3) and cap screws (4)	Remove	Support relay (5)
		d. Lockout relay (5)	Lower and remove	From instrument panel

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

d. Lockout Relay (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connectors and relay terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
INSPECTION				
4		Nut (2) and screw (4)	Inspect	Replace if threads damaged
5		Harness wires	Inspect	Replace if insulation frayed, or if conductors broken
6		Relay (5)	Inspect	Replace if terminals damaged
INSTALLATION				
7	Instrument panel, bottom center	a. Lockout relay (5)	Position	Against instrument panel
		b. Two screws (4), lock washers (3) and nuts (2)	Install and tighten	Until lockout relay (5) is securely mounted
		c. Wire leads (1)	Push on	Relay terminals (note tags for correct connection)

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

e. Warning Lights and Diodes.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Testing
- e. Installation

INITIAL SETUP

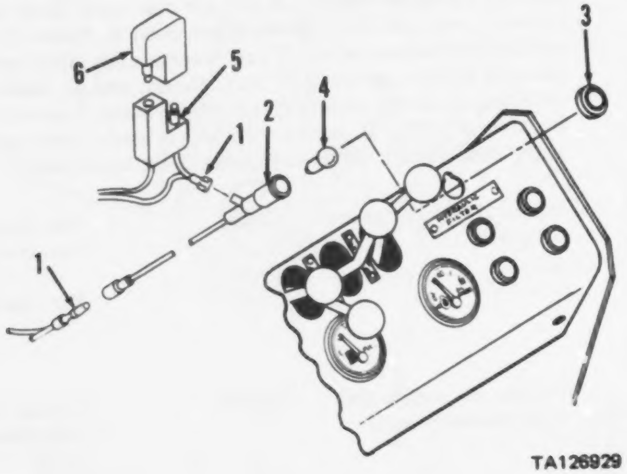
TOOLS
None

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-53h	Noise baffle mat removed.

KEY
1. Wire leads
2. Socket
3. Lens
4. Bulb
5. Connector
6. Diode



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STEP	LOCATION	ITEM	ACTION	REMARKS

NOTE

All five warning light assemblies are identical except for legend marked on lens (3). Isolation diode (6) for ALTERNATOR warning light is located in engine compartment (see para 2-26). Isolation diode (6) not used with OIL PRESSURE warning light.

REMOVAL

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Instrument panel, far right side	a. Wire leads (1)	Grasp and pull	From warning light terminals
		b. Socket (2)	Push	Against instrument panel
		c. Lens (3)	Rotate 1/4 turn	Support socket (2)
		d. Socket (2)	Lower and remove	From instrument panel
		e. Bulb (4)	Remove	
		f. Isolation diode (6)	Grasp and pull	From connector (5)

2-28. INSTRUMENT PANEL MAINTENANCE (cont)

e. *Warning Lights and Diodes (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		Electrical connectors and terminals (1, 2, 5 and 6)	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
3		Lens (3)	Clean	Use clean, dry cloth
INSPECTION				
4		Harness, connector and light assembly wires	Inspect	Replace if insulation frayed, or if conductors broken
TESTING				
5		Isolation diode (6)	Test	Set ohmmeter to lowest resistance range, and connect leads to terminals of diode (6). Note reading, then reverse leads and note reading. There should be one low and one high reading. Replace diode if readings are both low, both high, or identical
INSTALLATION				
6	Instrument panel, far right side	a. Isolation diode (6)	Push on	Connector (5)
		b. Bulb (4)	Install	In socket (2)
		c. Socket (2)	Position	From below instrument panel
		d. Lens (3)	Position	On instrument panel top
		e. Socket (2) and lens (3)	Push together	While rotating lens 1/4 turn to secure socket (2)
		f. Wire leads (1)	Push on	Warning light terminals

2-29. AUXILIARY PANEL MAINTENANCE

a. Slave Receptacle.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement

INITIAL SETUP

TOOLS

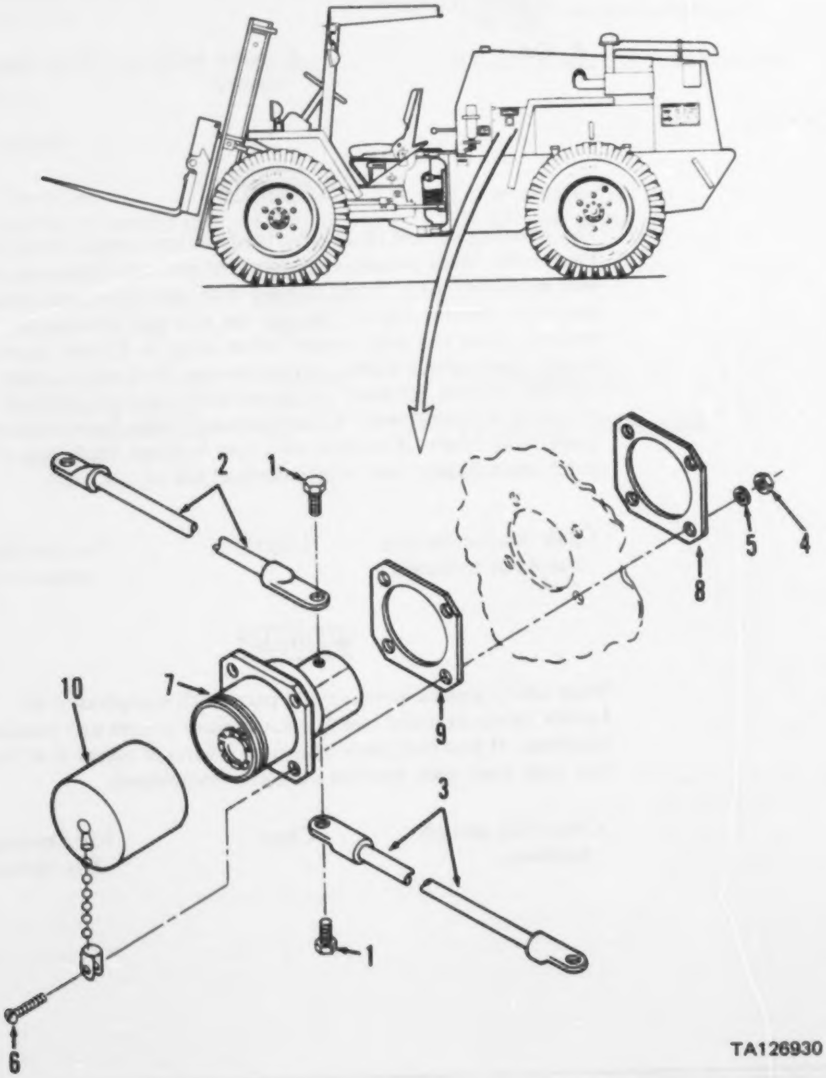
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.
2-53c	Left side panel removed.
2-53e	Left hood support plate removed.



KEY
1. Cap screws
2. Negative cable
3. Positive cable
4. Nuts
5. Flat washers
6. Screws
7. Slave receptacle
8. Rubber insulator
9. Rubber insulator
10. Cover

2-29. AUXILIARY PANEL MAINTENANCE (cont)

a. Slave Receptacle (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Left hood support plate, top	a. Two cap screws (1) and cables (2 and 3)	Remove	From slave receptacle (7)
		b. Four nuts (4), flat washers (5) and screws (6)	Remove	Support receptacle (7)
		c. Receptacle (7) and rubber insulators (8 and 9)	Remove	From left side panel
		d. Cover (10)	Unscrew and remove	From receptacle (7)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Cable connectors and receptacle terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Cover (10) and all hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air

2-29. AUXILIARY PANEL MAINTENANCE (cont)

a. Slave Receptacle (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		All hardware	Inspect	Replace if worn, or if threads damaged
5		Cables (2 and 3)	Inspect	Replace if insulation frayed, or if conductors broken
6		Receptacle (7) and cover (10)	Inspect	Replace if threads damaged, or if receptacle terminals damaged
7		Rubber insulators (8 and 9)	Inspect	Replace if cracked or deteriorated
INSTALLATION/REPLACEMENT				
8	Left hood support plate, top	a. Cover (10)	Install	On receptacle (7)
		b. Rubber insulators (8 and 9) and receptacle (7)	Position	On left side panel
		c. Four screws (6) flat washers (5) and nuts (4)	Install and tighten	
		d. Cables (2 and 3) and two cap screws (1)	Install and tighten	On receptacle (7)
		e. Cable connectors and cap screws (1)	Seal	Use silicone rubber sealer

2-29. AUXILIARY PANEL MAINTENANCE (cont)

b. Hourmeter.

This task covers:				
	a.	Removal	c.	Inspection
	b.	Cleaning	d.	Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

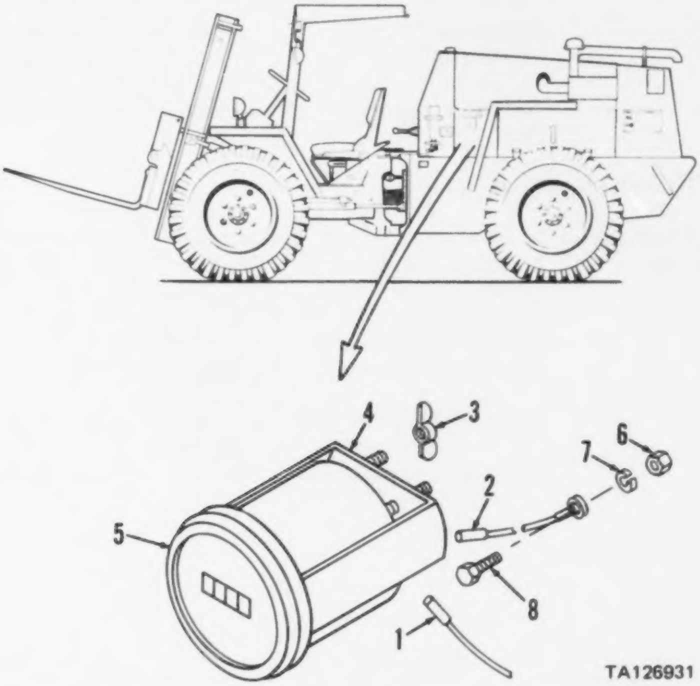
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53c	Left side panel removed.

KEY
1. Positive wire lead
2. Ground wire lead
3. Wing nuts
4. Bracket
5. Hourmeter
6. Nut
7. Lock washer
8. Cap screw



STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Left hood support plate, bottom	a. Wire leads (1 and 2)	Tag and disconnect	From hourmeter (5)
		b. Two wing nuts (3) and bracket (4)	Remove	Support hourmeter (5)
		c. Hourmeter (5)	Remove	From left side panel
		d. Nut (6), lock washer (7) and cap screw (8)	Remove	From left side fender
		e. Ground wire and lead (2)	Remove	

2-29. AUXILIARY PANEL MAINTENANCE (cont)

b. Hourmeter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING		**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		Wire connectors and hourmeter terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
3		Bracket (4) and all hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
4		All hardware	Inspect	Replace if worn, or if threads damaged
5		Positive wire and ground wire	Inspect	Replace if insulation frayed, or if conductors broken
6		Hourmeter	Inspect	Replace if threads damaged, or if receptacle terminals damaged
7		Bracket (4)	Inspect	Replace hourmeter if bracket (4) cracked or damaged
INSTALLATION/REPLACEMENT				
8	Left hood support plate, bottom	a. Ground wire and lead (2)	Position	Inside left fender bolt hole
		b. Cap screw (8), lock washer (7) and nut (6)	Install and tighten	
		c. Hourmeter (5)	Position	On left side panel
		d. Bracket (4)	Position	On hourmeter studs
		e. Two wing nuts (3)	Tighten both evenly	Until hourmeter is securely mounted
		f. Wire leads (1 and 2)	Push on	Note tags for correct connection
		g. All leads and terminals	Seal	Use silicone rubber sealer

2-30. LIGHT SYSTEMS MAINTENANCE

a. Flood Lights.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Testing

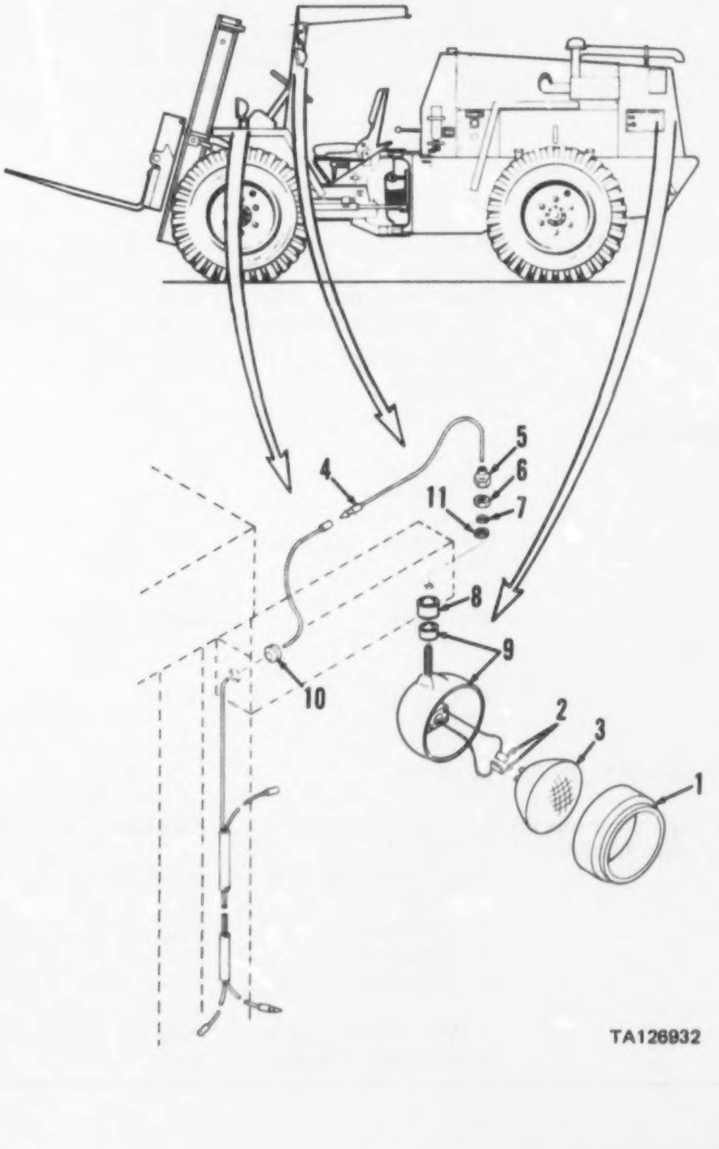
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and grille open.



KEY
1. Rubber gasket
2. Wire leads
3. Lamp
4. Male connector
5. Seal (used on ROPS mounted flood lights only)
6. Nut
7. Lock washer
8. Seal (not used on instrument panel mounted flood lights)
9. Housing and spacer
10. Grommet (used on ROPS mounted flood lights only)
11. Washer

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2-30. LIGHT SYSTEMS MAINTENANCE (cont)

a. Flood Lights (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front or rear	a. Rubber gasket (1)	Pull inserts	From cut outs in housing (9)
		b. Rubber gasket (1)	Pull and remove	From housing (9) and lamp (3)
		c. Wire leads (2)	Tag, grasp and pull	From lamp (3); set lamp (3) aside
		d. Connector (4)	Grasp and pull	From harness lead
		e. Seal (5)	Grasp and pull from nut (6)	Not used on instrument panel-mounted flood lights or rear flood lights
		f. Nut (6), lock washer (7) and washer (11)	Remove	Support housing (9)
		g. Housing and spacer (9) and seal (8)	Remove	Seal (8) not used on instrument panel-mounted flood lights
		h. Grommet (10)	Remove	From ROPS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Wire connectors and terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
3		Gasket (1), seals (5 and 8) and grommet (10)	Clean	Wipe with a clean, dry cloth

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		Housing (9) and hardware (6, 7 and 11)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
5		All hardware	Inspect	Replace if worn, or if threads damaged

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

a. Flood Lights (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
6		All wiring	Inspect	Replace if insulation frayed, or if conductors broken
7		Rubber gasket (1), seals (5 and 8) and grommet (10)	Inspect	Replace if cracked or deteriorated
8		Housing (9)	Inspect	Replace if cracked or if threads damaged
INSTALLATION/REPLACEMENT				
9	Front or rear	a. Grommet (10)	Slide over harness lead and install	On ROPS only
		NOTE Mark a spot for a drain hole on bottom of housing (9). Using 1/4 inch drill bit, drill hole at mark. Apply paint around hole to stop rust and corrosion.		
		b. Seal (8) and housing and spacer (9)	Position on vehicle	Seal (8) not used on instrument panel-mounted flood lights
		c. Washer (11), lock washer (7), nut (6) and seal (5)	Slide over connector (4) and tighten	Until flood light housing (9) is securely mounted. Seal (5) used on ROPS mounted flood lights only
		d. Connector (4)	Push in	Harness lead
		e. Rubber gasket (1)	Pull over lamp (3)	
		f. Wire leads (2)	Push on	Lamp terminals
		g. Rubber tangs of gasket (1)	Push into cutouts in housing (9)	Use a screwdriver to fully position tangs if necessary
TESTING				
10	Instrument panel	a. IGNITION switch	Place in ON position	
		b. VEHICLE LIGHTS switch	Place in SER. DRIVE position	
		c. FRONT FLOOD switch or REAR FLOOD switch as appropriate	Place in ON position	
11	Front or rear	Flood lights	Check	Front or rear flood lights should be on; if flood lights are on, place IGNITION, FRONT FLOOD or REAR FLOOD, and VEHICLE LIGHTS switches in OFF positions

NOTE

If flood lights are not on, refer to troubleshooting, paragraph 2-24 and troubleshoot light systems.

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

b. Front Blackout Light.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Testing

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

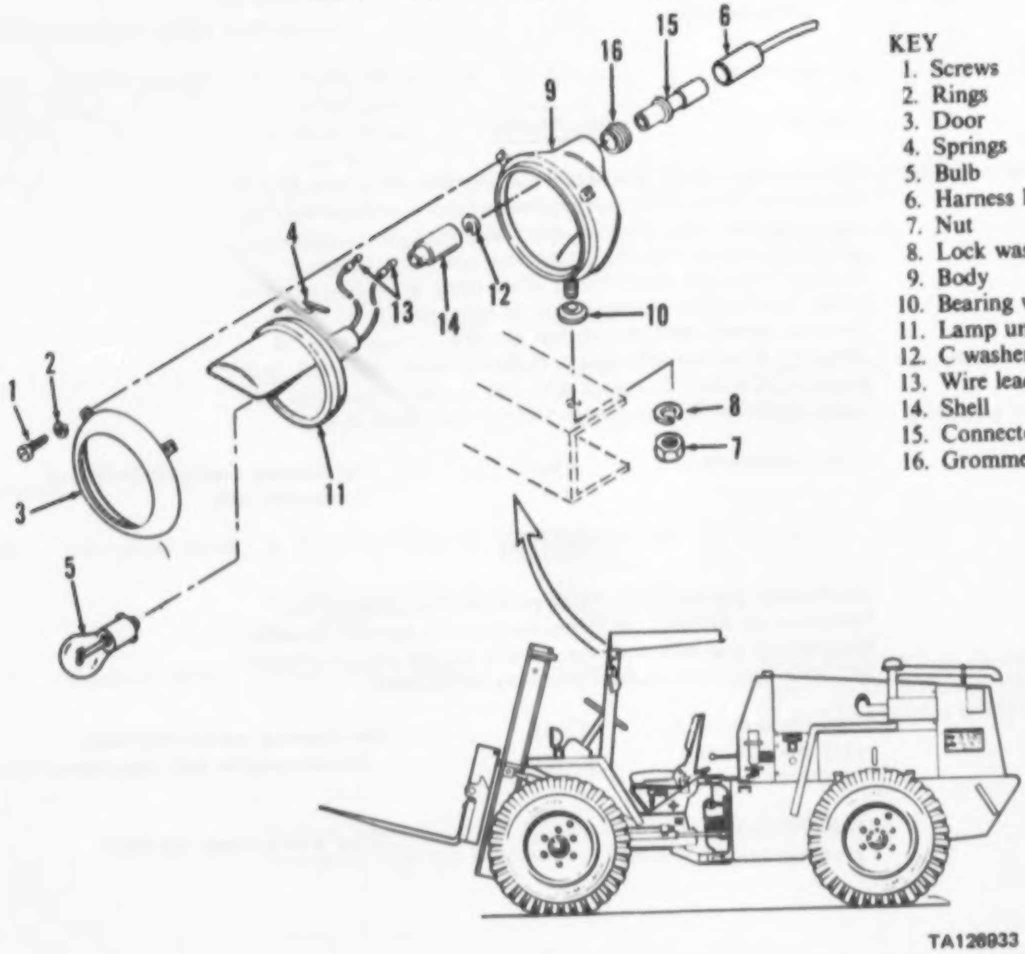
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.

NOTE

Two different blackout lights are used; one type uses bulb (5), the other type uses lamp unit (11).



KEY
1. Screws
2. Rings
3. Door
4. Springs
5. Bulb
6. Harness lead
7. Nut
8. Lock washer
9. Body
10. Bearing washer
11. Lamp unit
12. C washer
13. Wire leads
14. Shell
15. Connector
16. Grommet

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

b. Front Blackout Light (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	ROPS, top left side	a. Three screws (1)	Loosen	
		b. Door (3)	Remove	From body (9)
		c. Bulb (5)	Depress, turn counterclockwise and remove	
		d. Three springs (4) and lamp unit (11)	Remove	
		e. Harness lead (6)	Grasp and pull	From connector (15)
		f. Nut and lock washer (8)	Remove	
		g. Body (9)	Lift and remove	From ROPS
		h. Connector (15) and grommet (16)	Remove	From body (9)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Wire connectors	Clean	Use cleaning solvent P-D-680 on connectors only

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Door (3), lamp unit (11), body (9) and hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
4		Shell (14) and grommet (16)	Clean	Wipe with a clean, dry cloth

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

b. Front Blackout Light (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
5		All hardware	Inspect	Replace if worn, or if threads damaged
6		All wiring	Inspect	Replace if insulation frayed, or if conductors broken
7		Door (3), body (9) and lamp unit (11)	Inspect	Replace if cracked or damaged
8		Shell (14), connector (15) and grommet (16)	Inspect	Replace if cracked, damaged or deteriorated
INSTALLATION/REPLACEMENT				
9	ROPS, top left side	a. Grommet (16) and connector (15)	Install	In body (9)
		b. Body (9) and washer (10)	Position	On ROPS
		c. Lock washer (8) and nut (7)	Install and tighten	Until blackout light is securely mounted
		d. Harness lead (6)	Push on	Connector (15)
		e. Shell (14) and washer (12)	Install	On wire lead (13)
		f. Lamp unit (11) and three springs (4)	Install	
		g. Bulb (5)	Install	Push bulb in, turn clockwise and release
		h. Door (3)	Position	On body (9)
		i. Three screws (1)	Tighten	Until door (3) is securely mounted
TESTING				
10	Instrument panel	a. IGNITION switch	Place in ON position	
		b. VEHICLE LIGHTS switch	Place in B.O. DRIVE position	
11	Front of vehicle	Front blackout light	Check	Front blackout light should be on; if on, place IGNITION and VEHICLE LIGHTS switches in OFF positions

NOTE

If front blackout light is not on, refer to troubleshooting, paragraph 2-24 and troubleshoot light systems.

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

c. Rear Blackout Lights.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Testing

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and grille open.

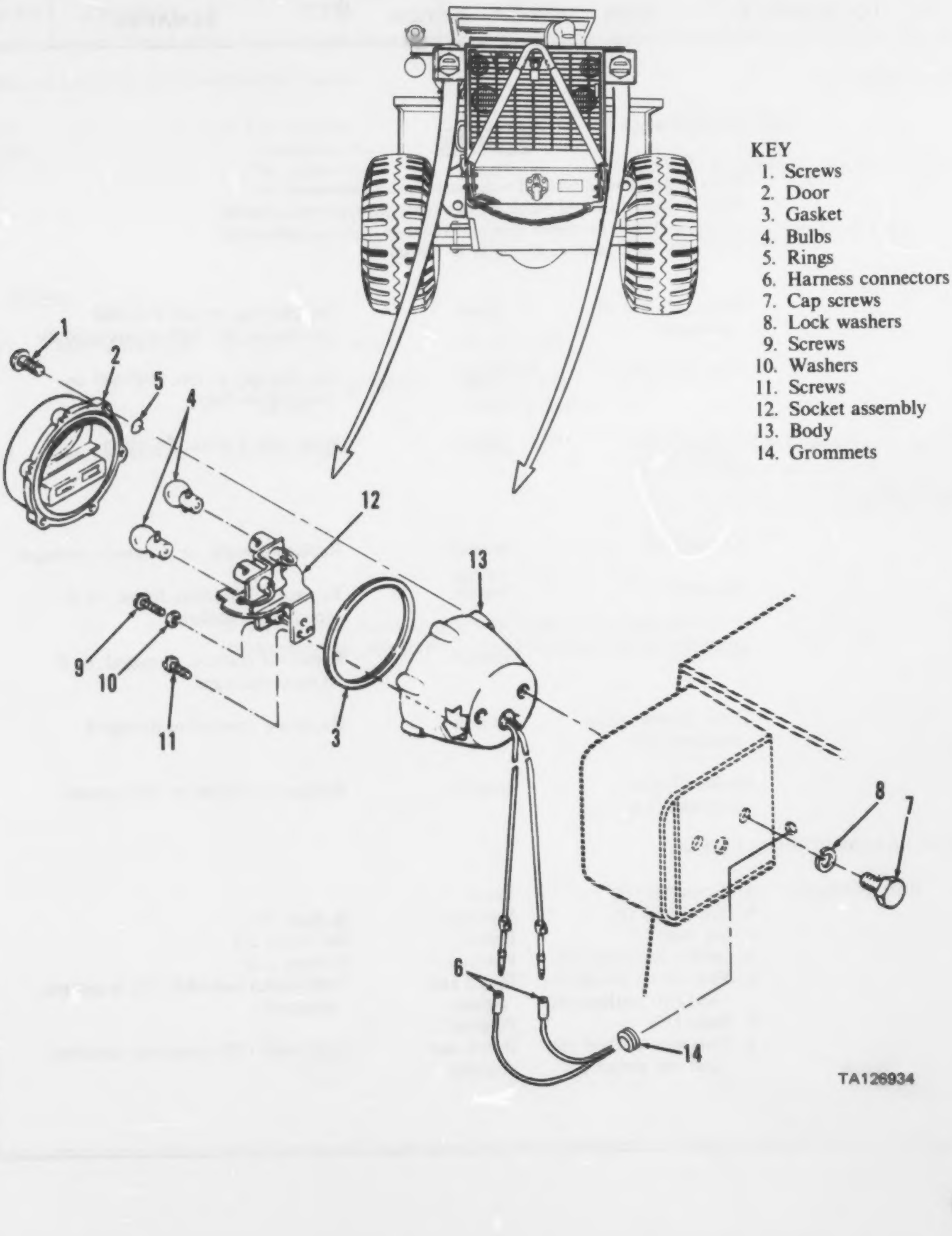
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Rear of vehicle	a. Six screws (1)	Loosen	
		b. Door (2) and gasket (3)	Remove	
		c. Two bulbs (4)	Depress, turn counterclockwise and remove	
		d. Two harness connectors (6)	Grasp and pull	From light assembly leads
		e. Two cap screws (7) and lock washers (8)	Remove	Support body (13)
		f. Body (13)	Remove	
		g. Five screws (9 and 11) and two washers (10)	Remove	Support socket assembly (12)
		h. Socket assembly (12)	Remove	From body (13)
		i. Six rings (5)	Remove	From screws (1)
		j. Six screws (1)	Remove	From door (2)
		k. Grommet (14)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

c. Rear Blackout Lights (cont).



KEY
1. Screws
2. Door
3. Gasket
4. Bulbs
5. Rings
6. Harness connectors
7. Cap screws
8. Lock washers
9. Screws
10. Washers
11. Screws
12. Socket assembly
13. Body
14. Grommets

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2-30. LIGHT SYSTEMS MAINTENANCE (cont)

c. Rear Blackout Lights (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
2		Body (13) and all hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connectors	Clean	Use cleaning solvent P-D-680 on connectors only
4		Door (2), gasket (3) and socket assembly (12)	Clean	Wipe with a clean, dry cloth
INSPECTION				
5		All hardware	Inspect	Replace if worn, or if threads damaged
6		All wiring	Inspect	Replace if insulation frayed, or if conductors broken
7		Body (13)	Inspect	Replace if cracked, damaged, or if threads damaged
8		Door (2) and socket assembly (12)	Inspect	Replace if cracked or damaged
9		Gasket (3) and grommet (14)	Inspect	Replace if cracked or deteriorated
INSTALLATION/REPLACEMENT				
10	Rear of vehicle	a. Grommet (14)	Install	
		b. Six screws (1)	Position	In door (2)
		c. Six rings (5)	Install	On screws (1)
		d. Socket assembly (12)	Position	In body (13)
		e. Five screws (9 and 11) and two washers (10)	Install and tighten	Until socket assembly (12) is securely mounted
		f. Body (13)	Position	
		g. Two lock washers (8) and cap screws (7)	Install and tighten	Until body (13) is securely mounted

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

c. Rear Blackout Lights (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
10 (cont)		h. Two harness connectors (6)	Push on	Light assembly leads
		i. Two bulbs (4)	Install	Push bulb in, turn 1/4 turn clockwise and release
		j. Gasket (3) and door (2)	Position	On body (13)
		k. Six screws (1)	Tighten	Until door (2) is securely mounted
TESTING				
11	Instrument panel	a. IGNITION switch	Place in ON position	
		b. VEHICLE LIGHTS switch	Place in B.O. DRIVE position	
12	Rear of vehicle	Blackout lights	Check	Rear blackout lights should be on; have an assistant depress service brake and check that stop light is on. If on, place IGNITION and VEHICLE LIGHTS switches in OFF positions

NOTE

If rear blackout lights and/or stop lights are not on, refer to troubleshooting, paragraph 2-24 and troubleshoot light systems.

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

d. Stop and Tail Light.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Testing

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

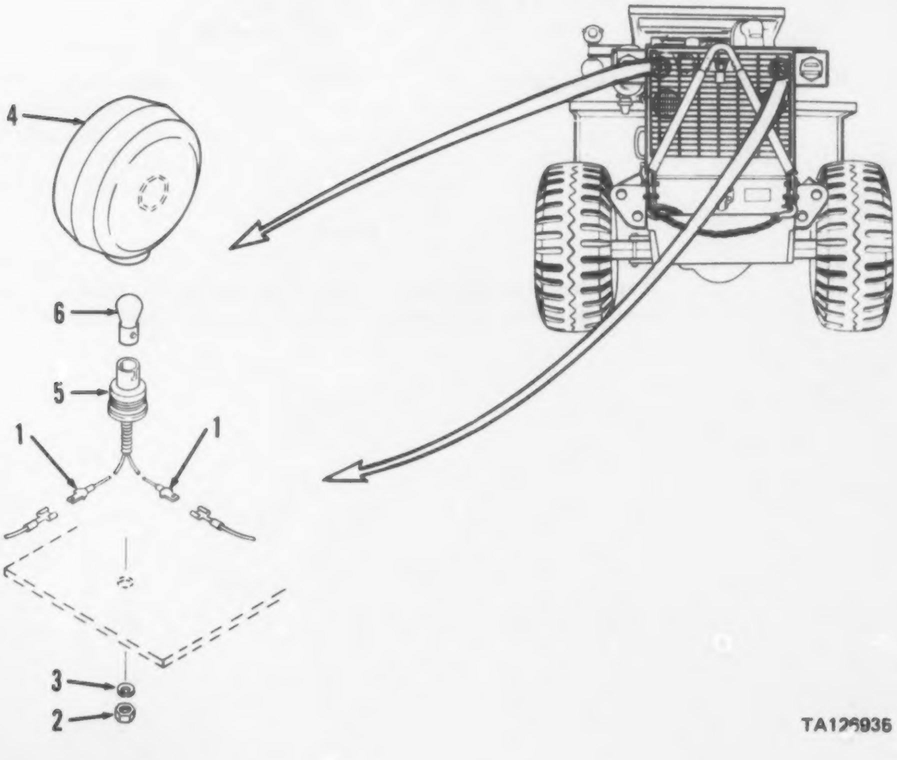
MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and grille open.



KEY
1. Wire leads
2. Nut
3. Lock washer
4. Lens
5. Socket assembly
6. Lamp

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2-30. LIGHT SYSTEMS MAINTENANCE (cont)

d. Stop and Tail Light (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Light brackets at rear of vehicle	a. Two wire leads (1)	Tag, grasp and pull	From harness leads
		b. Nut (2) and lock washer (3)	Remove	
		c. Lens (4) and socket assembly (5)	Lift and remove	From light bracket
		d. Lens (4)	Unscrew and remove	Turn counterclockwise and lift from socket assembly (5)
		e. Lamp (6)	Depress, turn counterclockwise and lift	From socket assembly (5)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Socket assembly (5), wire terminals and connectors, and hardware	Clean	Use cleaning solvent P-D-680 on metal parts only
3		Lens (4)	Clean	Wipe with a clean dry cloth
INSPECTION				
4		All hardware	Inspect	Replace if worn, or threads damaged
5		All wiring	Inspect	Replace if insulation frayed, or if conductors broken
6		Lens (4)	Inspect	Replace if cracked or deteriorated
7		Socket assembly (5)	Inspect	Replace if wires, connectors or socket damaged

2-30. LIGHT SYSTEMS MAINTENANCE (cont)

d. Stop and Tail Light (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
8	Light brackets at rear of vehicle	a. Lamp (6)	Install	Push lamp in socket assembly (5), turn clockwise and release
		b. Lens (4)	Install	Turn clockwise on socket assembly (5) hand-tight only
		c. Lens (4) and socket assembly (5)	Position	On light bracket
		d. Lock washer (3) and nut (2)	Install and tighten	Until stop and tail light is securely mounted
		e. Two wire leads (1)	Push on	Harness connectors
TESTING				
9	Instrument panel	a. IGNITION switch	Place in ON position	
		b. VEHICLE LIGHTS switch	Place in SER DRIVE position	
10	Rear of vehicle	Stop and tail lights	Check	Tail lights should be on; have an assistant depress service brake and check that stop light is on; if lights are on, place IGNITION and VEHICLE LIGHTS switches in OFF positions

NOTE

If stop and/or tail lights are not on, refer to troubleshooting, paragraph 2-24 and troubleshoot light systems.

2-31. SENDING UNITS AND SWITCHES MAINTENANCE

a. Fuel Gage Sending Unit.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

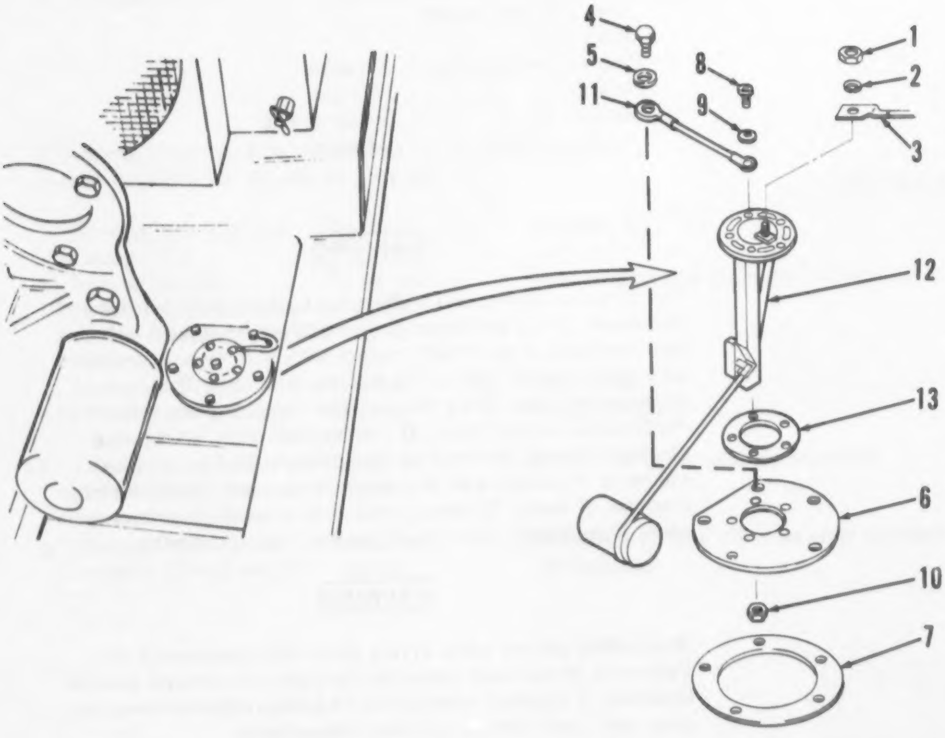
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Gaskets

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53c	Left side panel removed.

KEY
1. Nut
2. Lock washer
3. Harness lead
4. Cap screws
5. Lock washers
6. Plate
7. Gasket
8. Screws
9. Washers
10. Lock nuts
11. Ground strap
12. Sending unit
13. Gasket



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2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

a. Fuel Gage Sending Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear left side of vehicle	a. Nut (1), lock washer (2) and harness lead (3)	Remove	From sending unit terminal
		b. Five cap screws (4) and lock washers (5)	Remove	
		c. Plate (6) and sending unit (12)	Lift and remove	From fuel tank
		d. Gasket (7)	Remove and discard	
		e. Five screws (8), washers (9), and lock nuts (10) and ground strap (11)	Remove	
		f. Plate (6) and sending unit (12)	Separate	
		g. Gasket (13)	Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Plate (6) and all hardware	Clean	Use cleaning solvent P-D-680. Dry parts thoroughly with compressed air
3		Wire connectors and terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

a. Fuel Gage Sending Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Hardware	Inspect	Replace if worn, or if threads damaged
5		All wires	Inspect	Replace if insulation frayed, or if conductors broken
6		Plate (6)	Inspect	Replace if bent, cracked or otherwise damaged
INSTALLATION				
7	Engine compartment rear, left side of vehicle	a. New gasket (13)	Position	On sending unit (12)

NOTE

In following step, be sure terminal at top of sending unit is directly opposite flat on side of plate (6).

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Sending unit (12) and gasket (13)	Position	On plate (6)
		c. Five screws (8), washers (9), and lock nuts (10) and ground strap (11)	Install and tighten	Until sending unit (12) is securely mounted
		d. New gasket (7)	Position	On fuel tank
		e. Plate (6) and sending unit (12)	Position	On gasket (7)
		f. Five cap screws (4) and lock washers (5), and ground strap (11)	Install and tighten	Until plate (6) is securely mounted
		g. Harness lead (3), lock washer (2) and nut (1)	Install and tighten	Until harness lead (3) is securely attached to terminal

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

b. Neutral Start and Back-up Alarm Switches.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

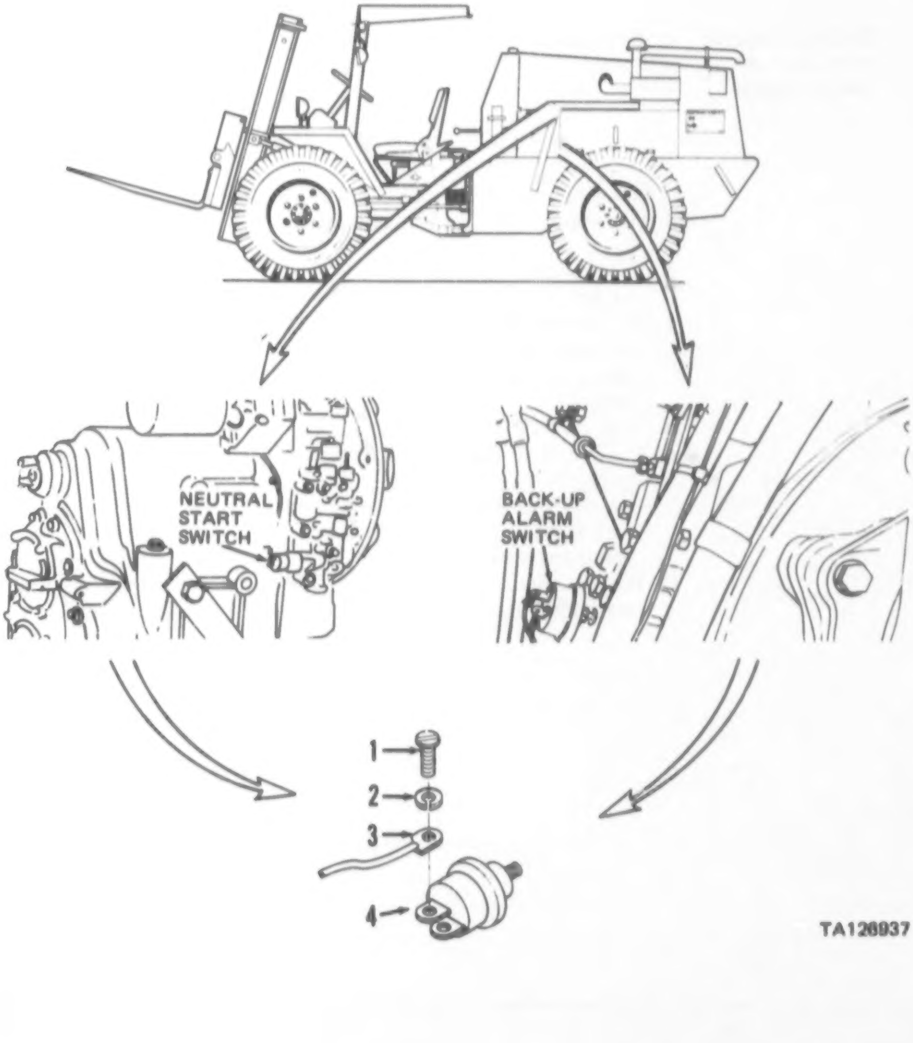
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53c	Left side panel removed.

KEY
1. Screws
2. Lock washers
3. Wire leads
4. Switch



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2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

b. Neutral Start and Back-up Alarm Switches (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment front, left side of vehicle	a. Two screws (1), lock washers (2) and wire leads (3)	Remove	From switch terminals
		b. Switch (4)	Remove	Turn counterclockwise and pull from transmission
CLEANING		**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately. **WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
2		Screws (1) and lock washers (2)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connectors and switch terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
INSPECTION				
4		Screws (1) and lock washers (2)	Inspect	Replace if worn, or if threads damaged
5		Harness wires	Inspect	Replace if insulation frayed, or if conductors broken
INSTALLATION				
6	Engine compartment front left side of vehicle	a. Switch (4)	Install and tighten	Turn clockwise until securely mounted to transmission
		b. Two wire leads (3), lock washers (2) and screws (1)	Install and tighten	Until wire leads (3) are securely mounted to switch terminals
		c. Wire leads (3) and switch terminals	Seal	Use silicone rubber sealer

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

c. Engine and Transmission Temperature Switches.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Testing
- e. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

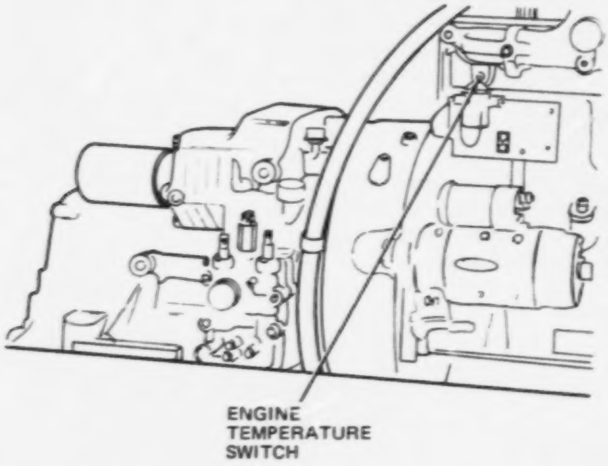
Cleaning solvent P-D-680

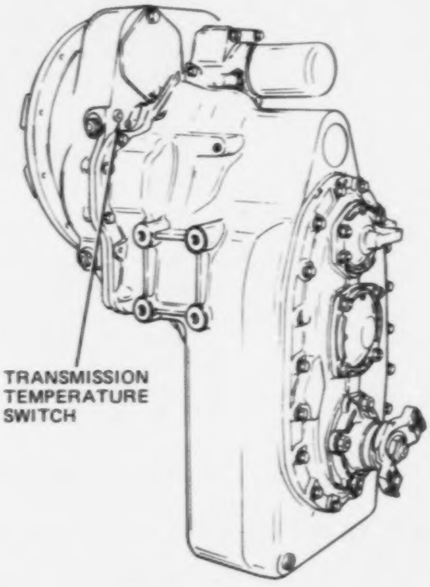
Clean cloths

Silicone rubber sealer

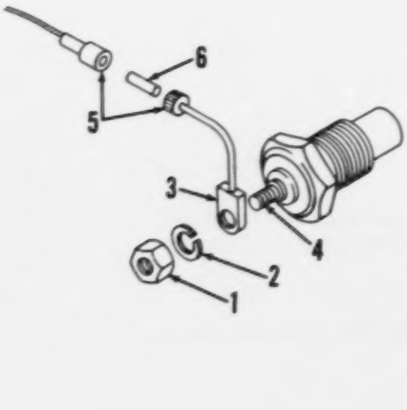
EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53c	Left side panel removed (engine temperature switch).
2-53c	Right side panel removed (transmission temperature switch).
2-27b	Starter relay removed (for engine temperature switch removal).





KEY
1. Nut
2. Lock washer
3. Wire lead
4. Switch
5. In-line retainer
6. Resistor



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2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

c. Engine and Transmission Temperature Switches (cont).

(1) Engine Temperature Switch.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment front, left side of vehicle	a. Nut (1), lock washer (2) and wire lead (3)	Remove	From switch terminal
		b. Temperature switch (4)	Remove	Turn counterclockwise and pull from engine
		c. Retainer halves (5)	Push together, turn and separate	Remove resistor (6)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Nut (1) and lock washer (2)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connector and switch terminal	Clean	Use cleaning solvent P-D-680 on connector and terminal only
INSPECTION				
4		Nut (1) and lock washer (2)	Inspect	Replace if worn, or if threads damaged
5		Harness wire	Inspect	Replace if insulation frayed, or if conductor broken

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2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

c. Engine and Transmission Temperature Switches (cont).

(1) Engine Temperature Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING				
6		Engine temperature switch	a. Fill container with water	
			b. Suspend threaded portion of switch in water	
			c. Connect ohmmeter between terminal and body of switch	Ohmmeter should indicate infinity
			d. Slowly heat water to 220 degrees while observing ohmmeter	Ohmmeter should indicate zero ohms when temperature of water is between 198 to 212 degrees
		NOTE Replace engine temperature switch if proper indication is not obtained in step 6d above.		
			e. Remove switch from water and disconnect ohmmeter leads	
INSTALLATION/REPLACEMENT				
7	Engine compartment front, left side of vehicle	a. Temperature switch (4)	Install and tighten	Turn clockwise until securely mounted to engine
		b. Wire lead (3), lock washer (2) and nut (1)	Install and tighten	Until wire lead (3) is securely mounted to switch terminal
		c. Wire lead (3) and switch terminal	Seal	Use silicone rubber sealer
		d. Resistor (6)	Position	In retainer halves (5)
		e. Retainer halves (5)	Push together and turn clockwise	To secure resistor (6)

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

c. Engine and Transmission Temperature Switches (cont).

(2) Transmission Temperature Switch.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment front, right side of vehicle	a. Nut (1), lock washer (2) and wire lead (3)	Remove	From switch terminal
		b. Temperature switch (4)	Remove	Turn counterclockwise and pull from transmission
		c. Retainer halves (5)	Push together, turn counterclockwise and separate	Remove resistor (6)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Nut (1) and lock washer (2)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connector and switch terminal	Clean	Use cleaning solvent P-D-680 on connector and terminal only
INSPECTION				
4		Nut (1) and lock washer (2)	Inspect	Replace if worn, or if threads damaged
5		Harness wire	Inspect	Replace if insulation frayed, or if conductor broken

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

c. Engine and Transmission Temperature Switches (cont).

(2) Transmission Temperature switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING				
6		Transmission temperature switch	a. Fill container with water	
			b. Suspend threaded portion of switch in water	
			c. Connect ohmmeter between switch terminal and body	Ohmmeter should indicate infinity
			d. Slowly heat water to 280 degrees while observing ohmmeter	Ohmmeter should indicate zero ohm when temperature of water is between 285-272 degrees
		NOTE Replace transmission temperature switch if proper indication is not obtained in step 6 above.		
			e. Remove switch from water and disconnect ohmmeter leads	
INSTALLATION/REPLACEMENT				
7	Engine compartment front, right side of vehicle	a. Temperature switch (4)	Install and tighten	Turn clockwise until securely mounted to transmission
		b. Wire lead (3), lock washer (2) and nut (1)	Install and tighten	Until wire lead (3) is securely mounted to switch terminal
		c. Wire lead (3) and switch terminal	Seal	Use silicone rubber sealer
		d. Resistor (6)	Position	In retainer halves (5)
		e. Retainer halves (5)	Push together and turn clockwise	To secure resistor (6)

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

d. Engine Oil Pressure Switch and Sending Unit.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Testing

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

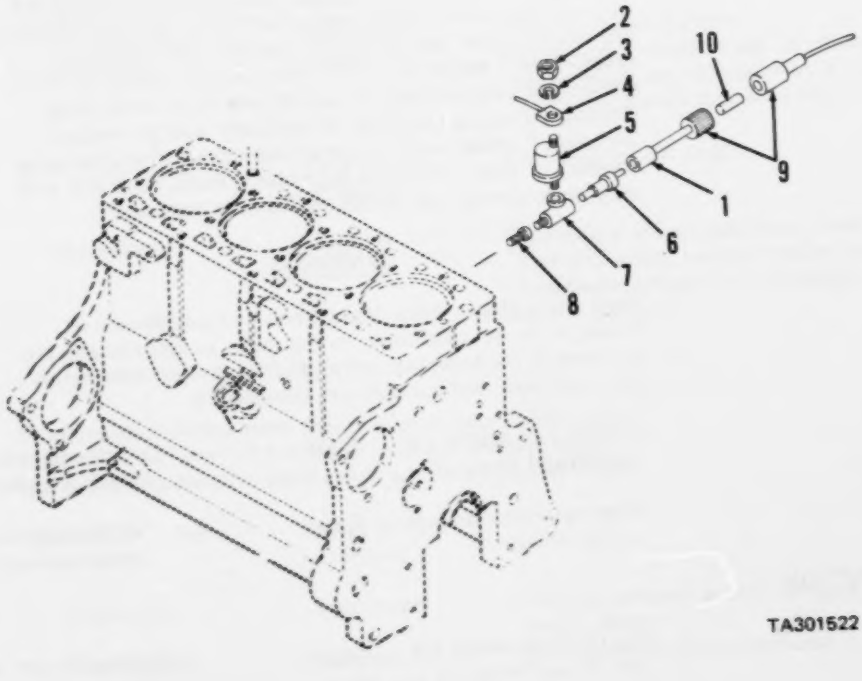
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-53c	Right side panel removed.

KEY
1. Harness connector
2. Nut
3. Lock washer
4. Wire lead
5. Oil pressure sender
6. Oil pressure switch
7. Tee
8. Fitting
9. In-line retainer
10. Resistor



2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

d. Engine Oil Pressure Switch and Sending Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment rear, right side of vehicle	a. Harness connector (1)	Grasp and pull	From terminal on switch (6)
		b. Nut (2), lock washer (3) and wire lead (4)	Remove	From terminal on sender (5)
		c. Sender (5) and switch (6)	Remove	Turn counterclockwise and pull from tee (7)
		d. Tee (7) and fitting (8)	Remove	Turn counterclockwise and pull from engine block
		e. Retainer halves (9)	Push together, turn counterclockwise and separate	Remove resistor (10)

CLEANING

WARNING

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WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Nut (2), lock washer (3), tee (7) and fitting (8)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connectors and switch terminals	Clean	Use cleaning solvent P-D-680 on connectors and terminals only
INSPECTION				
4		Nut (2), lock washer (3), tee (7) and fitting (8)	Inspect	Replace if worn or cracked, or if threads damaged
5		Harness wires	Inspect	Replace if insulation frayed, or if conductor broken

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

d. Engine Oil Pressure Switch and Sending Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
6	Engine compartment rear, right side of vehicle	a. Fitting (8) and tee (7)	Install and tighten	Until securely mounted on engine block
		b. Sender (5) and switch (6)	Install and tighten	Until securely mounted to tee (7)
		c. Wire lead (4), lock washer (3) and nut (2)	Install and tighten	Until wire lead (4) is securely mounted to terminal of sender (5)
		d. Harness connector (1)	Push on	Terminal of switch (6)
		e. Wire leads (1 and 4) and terminals	Seal	Use silicone rubber sealer
		f. Resistor (10)	Position	In retainer halves (9)
		g. Retainer halves (9)	Push together, turn clockwise and release	To secure resistor (10)
TESTING (OIL PRESSURE SENDER)				
7	Engine compartment rear, right side of vehicle	a. Nut (2) and lock washer (3)	Remove	
		b. Wire lead (4)	Disconnect	From oil pressure sender
		c. Ohmmeter	Connect	Between oil pressure sender terminal and engine block; set ohmmeter to X1 scale. Ohmmeter should indicate 1 ohm or less
8	Operator's compartment	IGNITION switch	Place in ON position	Start and operate engine
9	Engine compartment rear, right side of vehicle	a. Ohmmeter	Observe	With engine idling, resistance should be over 13.5 ohms; increase engine speed. Resistance indicated on ohmmeter should increase

NOTE

If ohmmeter indicates more than 1 ohm in step 7 above, or if resistance is not over 13.5 ohms or does not increase when engine speed increases in step 9 above, replace oil pressure sender.

STEP	LOCATION	ITEM	ACTION	REMARKS
10	Operator's compartment	IGNITION switch	Place in OFF position	
11	Engine compartment rear, right side of vehicle	a. Ohmmeter	Disconnect	From oil pressure sender terminal and engine block
		b. Wire lead (4)	Connect	To oil pressure sender terminal
		c. Lock washer (3) and nut (2)	Install and tighten	

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

e. Stop Light and Hydraulic Filter Switches.

This task covers: a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

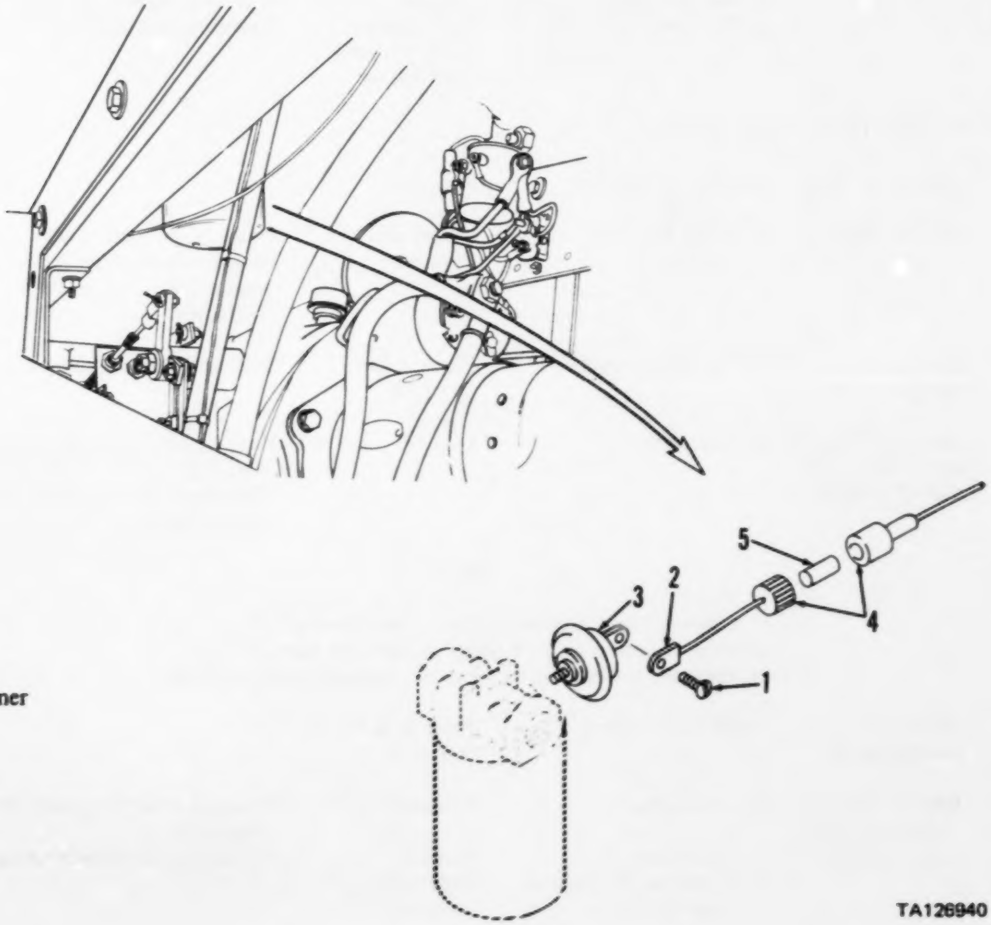
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

- Cleaning solvent P-D-680
- Clean cloths
- Silicone rubber sealer

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-53c	Left side panel removed (hydraulic filter switch).
2-53i	Chassis guard removed.



KEY
1. Screw
2. Wire lead
3. Switch
4. In-line retainer
5. Resistor

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

e. Stop Light and Hydraulic Filter Switches (cont).

(1) Hydraulic Filter Restriction Switch.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment front, left side of vehicle	a. Screw (1) and wire lead (2)	Remove	From terminal on switch (3)
		b. Switch (3)	Remove	Turn counterclockwise and pull from filter head
		c. Retainer halves (4)	Push together, turn counterclockwise and separate	Remove resistor (5)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Screw (1)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire lead and terminal	Clean	Use cleaning solvent P-D-680 on connector and terminal only
INSPECTION				
4		Screw (1) and switch (3)	Inspect	Replace if worn or cracked, or if threads damaged
5		Wires	Inspect	Replace if insulation frayed, or if conductor broken

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

e. Stop Light and Hydraulic Filter Switches (cont).

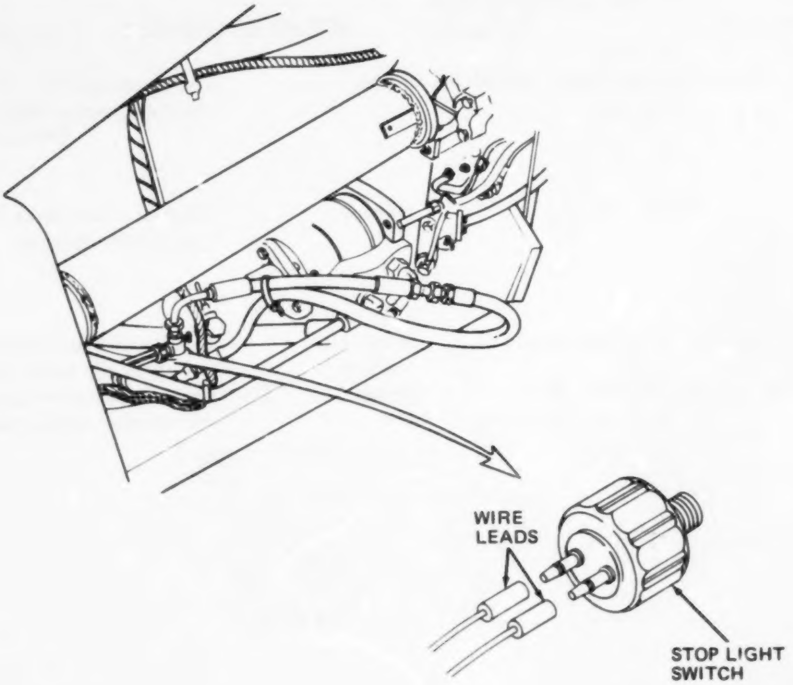
(1) Hydraulic Filter Restriction Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
6	Engine compartment front, left side of vehicle	a. Resistor (5)	Position	In retainer halves (4)
		b. Retainer halves (4)	Push together, turn clockwise and release	To secure resistor (5)
		c. Switch (3)	Install and tighten	Turn clockwise until securely mounted to filter head
		d. Wire lead (2) and screw (1)	Install and tighten	Until wire lead (2) is securely mounted to terminal of switch (3)
		e. Wire lead (2) and terminal	Seal	Use silicone rubber sealer

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

e. Stop Light and Hydraulic Filter Switches (cont).

(2) Stop Light Switch.



STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Hydraulic brake valve, bottom rear of vehicle	a. Two wire leads	Grasp and pull	From stop light switch
		b. Stop light switch	Remove	Turn counterclockwise and pull from hydraulic brake valve
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-31. SENDING UNITS AND SWITCHES MAINTENANCE (cont)

e. Stop Light and Hydraulic Filter Switches (cont).

(2) Stop Light Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
2		Wire leads and switch terminals	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
INSPECTION				
3		Wires	Inspect	Replace if insulation frayed, or if conductors broken
INSTALLATION				
4	Hydraulic brake valve, bottom rear of vehicle	a. Stop light switch	Install and tighten	Turn clockwise until securely mounted to hydraulic brake valve
		b. Two wire leads	Install	Push on switch terminals
		c. Two wire leads and terminals	Seal	Use silicone rubber seal

2-32. HORN AND BACK-UP ALARM MAINTENANCE

a. Horn.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

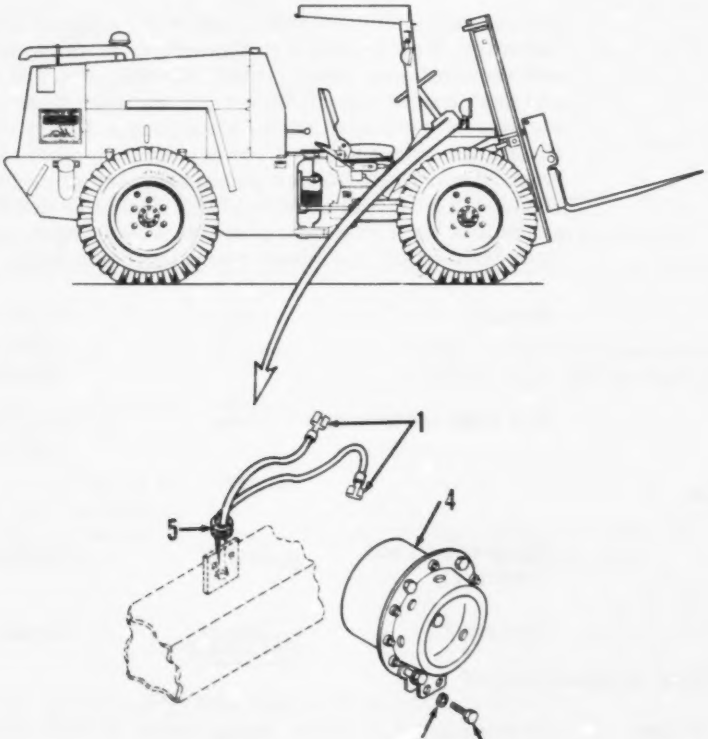
TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.

KEY
1. Wire leads
2. Cap screws
3. Washers
4. Horn
5. Grommet



2-32. HORN AND BACK-UP ALARM MAINTENANCE (cont)

a. Horn (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Top of right fender support, front of vehicle	a. Two wire leads (1)	Tag and disconnect	Grasp and pull from terminals of horn (4)
		b. Two cap screws (2) and washers (3)	Remove	Support horn (4)
		c. Horn (4)	Remove	Lift from fender support
		d. Grommet (5)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Horn (4)	Clean	Wipe exterior with cloth moistened in cleaning solvent P-D-680 and dry thoroughly
3		Wire leads and terminals	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
INSPECTION				
4		Cap screws (2) and washers (3)	Inspect	Replace if worn, or if threads damaged
5		Grommet (5)	Inspect	Replace if worn, cracked or deteriorated
INSTALLATION/REPLACEMENT				
6	Top of right fender support, front of vehicle	a. Grommet (5)	Install	
		b. Horn (4)	Position	On bracket of fender support
		c. Two cap screws (2) and washers (3)	Install and tighten	Until horn (4) is securely mounted
		d. Two wire leads (1)	Push on horn terminals	Note tags for correct connection

2-32. HORN AND BACK-UP ALARM MAINTENANCE (cont)

b. Horn Switch.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Testing
e. Installation/Replacement

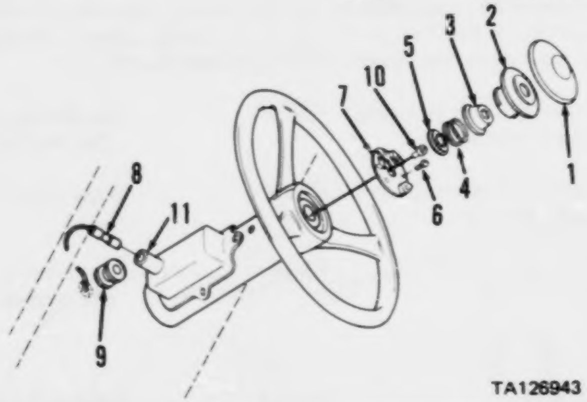
INITIAL SETUP

TOOLS	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning Solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.



KEY
1. Cover
2. Horn button
3. Contact cup
4. Spring
5. Spring contact
6. Tapping screws
7. Base plate
8. Harness connector
9. Grommet
10. Ferrule
11. Column terminal

TA126943

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Steering column and wheel	a. Cover (1) and button (2)	Remove	Depress and rotate counterclockwise to release from tabs on base plate (7)
		b. Contact cup (3), spring (4) and spring contact (5)	Remove	
		c. Three tapping screws (6) and base plate (7)	Remove	
		d. Harness connector (8)	Grasp and pull	From column terminal (11)
		e. Grommet (9)	Remove	From instrument panel
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-32. HORN AND BACK-UP ALARM MAINTENANCE (cont)

b. Horn Switch (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
2		Contacts (3 and 5), spring (4) and screws (6)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Cover (1), button (2) and base plate (7)	Clean	Wipe with a clean, dry cloth
4		Connector (8) and terminal (11)	Clean	Use cleaning solvent P-D-680 on terminal and connector only
INSPECTION				
5		Spring (4)	Inspect	Replace if coils bent or broken
6		Contacts (3 and 5)	Inspect	Replace if cracked, corroded or damaged
7		Cover (1), horn button (2) and base plate (7)	Inspect	Replace if cracked, worn or damaged
8		Grommet (9)	Inspect	Replace if worn or deteriorated
TESTING				
9		Horn wire in steering column	Test	Set ohmmeter to lowest resistance range, and connect leads to horn wire at ferrule (10) and terminal (11). Replace horn wire if ohmmeter indicates more than 0.5 ohm (notify direct support maintenance).
INSTALLATION/REPLACEMENT				
10	Steering column and wheel	a. Grommet (9)	Install	
		b. Harness connector (8)	Push in	Column terminal (11)
		c. Base plate (7)	Position	On steering wheel
		d. Three tapping screws (6)	Install and tighten	Until base plate (7) is securely mounted
		e. Spring contact (5), spring (4) and contact cup (3)	Position	On base plate (7)
		f. Horn button (2) and cover (1)	Install	Depress and rotate clockwise to lock tabs on base plate (7); then release

2-32. HORN AND BACK-UP ALARM MAINTENANCE (cont)

c. *Back-up Alarm.*

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

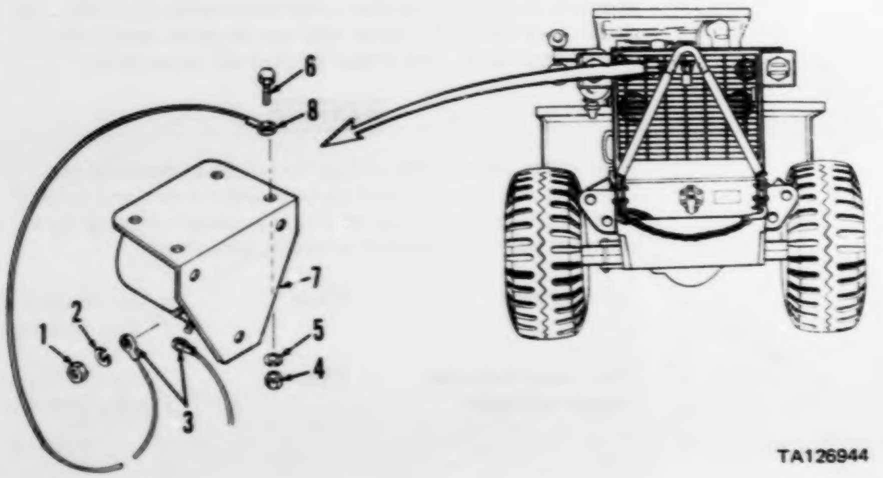
Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and grille open.

KEY
1. Nuts
2. Lock washers
3. Wire leads
4. Nuts
5. Lock washers
6. Cap screws
7. Back-up alarm
8. Ground wire



STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Top left rear of vehicle	a. Wire leads	Tag	
		b. Two nuts (1), lock washers (2) and wire leads (3)	Remove	Tag wire leads, then remove from alarm terminals
		c. Two nuts (4); lock washers (5) and cap screws (6)	Remove	Support alarm (7) and wire (8)
		d. Back-up alarm (7) and ground wire (8)	Remove	

2-32. HORN AND BACK-UP ALARM MAINTENANCE (cont)

c. Back-up Alarm (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Wire connectors and alarm terminals	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
INSPECTION				
4		Hardware	Inspect	Replace if worn, or if threads damaged
5		Harness wire and ground wire (8)	Inspect	Replace if insulation frayed, or if conductors broken
INSTALLATION				
6	Top left rear of vehicle	a. Back-up alarm (7)	Position	On mounting bracket
		b. Wire (8), two cap screws (6), lock washers (5) and nuts (4)	Install and tighten	Until alarm (7) and ground wire (8) are securely mounted
		c. Two wire leads (3)	Position	On alarm terminals. Note tags for correct connection
		d. Two lock washers (2) and nuts (1)	Install and tighten	Until leads (3) are securely mounted

2-33. BATTERY SYSTEM MAINTENANCE

a. Battery Cover.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

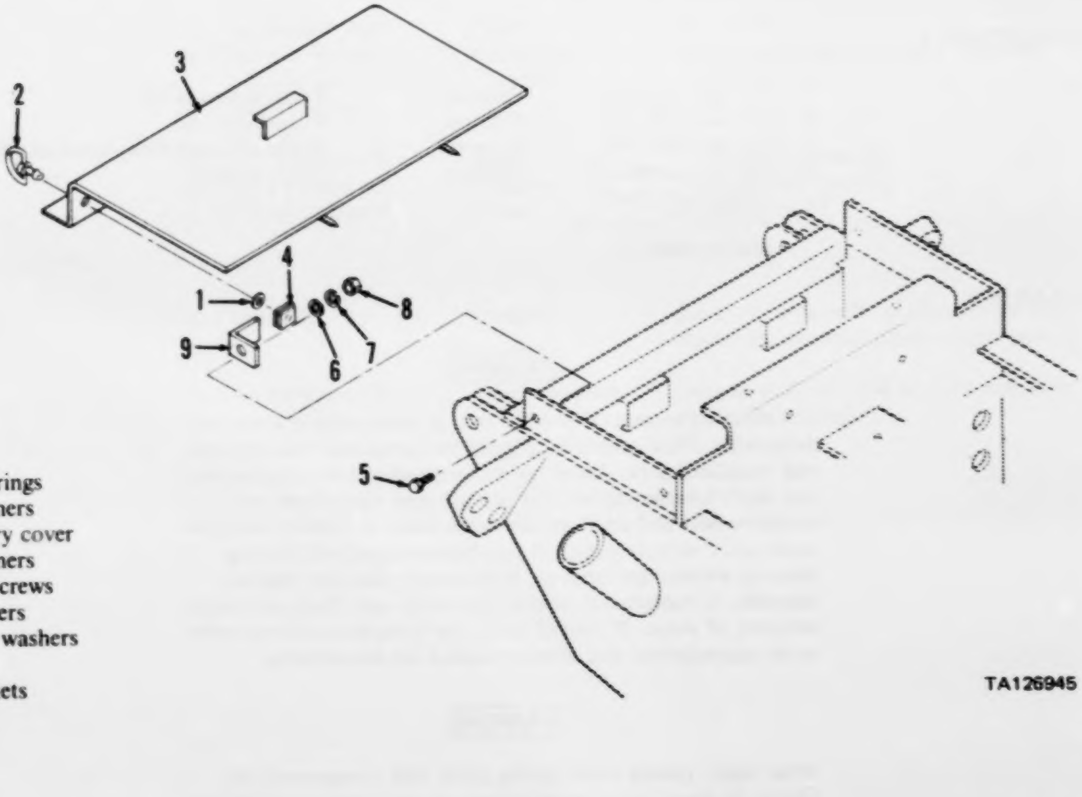
MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

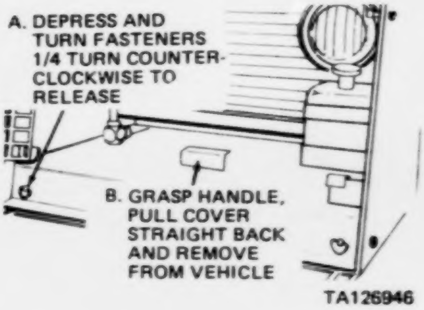
Paragraph	Condition Description
	Engine off. IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and grille open.



KEY
1. Split rings
2. Fasteners
3. Battery cover
4. Retainers
5. Cap screws
6. Washers
7. Lock washers
8. Nuts
9. Brackets

2-33. BATTERY SYSTEM MAINTENANCE (cont)

a. Battery Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1		 A. DEPRESS AND TURN FASTENERS 1/4 TURN COUNTER-CLOCKWISE TO RELEASE B. GRASP HANDLE, PULL COVER STRAIGHT BACK AND REMOVE FROM VEHICLE TA126946		
DISASSEMBLY				
2		a. Two split rings (1)	Remove	From fasteners (2)
		b. Two fasteners (2)	Remove	From cover (3)
		c. Two retainers (4)	Remove	Grasp and pull from brackets (9)
		d. Two cap screws (5), washers (6), lock washers (7), nuts (8) and brackets (9)	Remove	From vehicle
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-33. BATTERY SYSTEM MAINTENANCE (cont)

a. Battery Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
4		Battery cover (3) and brackets (9)	Inspect	Replace if cracked or broken
5		All hardware	Inspect	Replace if worn, or if threads damaged
REASSEMBLY				
6		a. Two brackets (9)	Position	On vehicle
		b. Two cap screws (5), washers (6), lock washers (7) and nuts (8)	Install and tighten	Until bracket (9) is securely mounted
		c. Two retainers (4)	Install	Push onto bracket (9)
		d. Two fasteners (2)	Position	Through hole in cover
		e. Two split rings (1)	Install	On fasteners (2)
INSTALLATION				
7		a. Cover (3)	Position	Grasp cover handle, position cover over batteries, and slide cover toward radiator
		b. Two fasteners (2)	Turn and latch	Depress and turn 1/4 turn clockwise to latch; then release

2-33. BATTERY SYSTEM MAINTENANCE (cont)

b. Battery Cables and Batteries.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

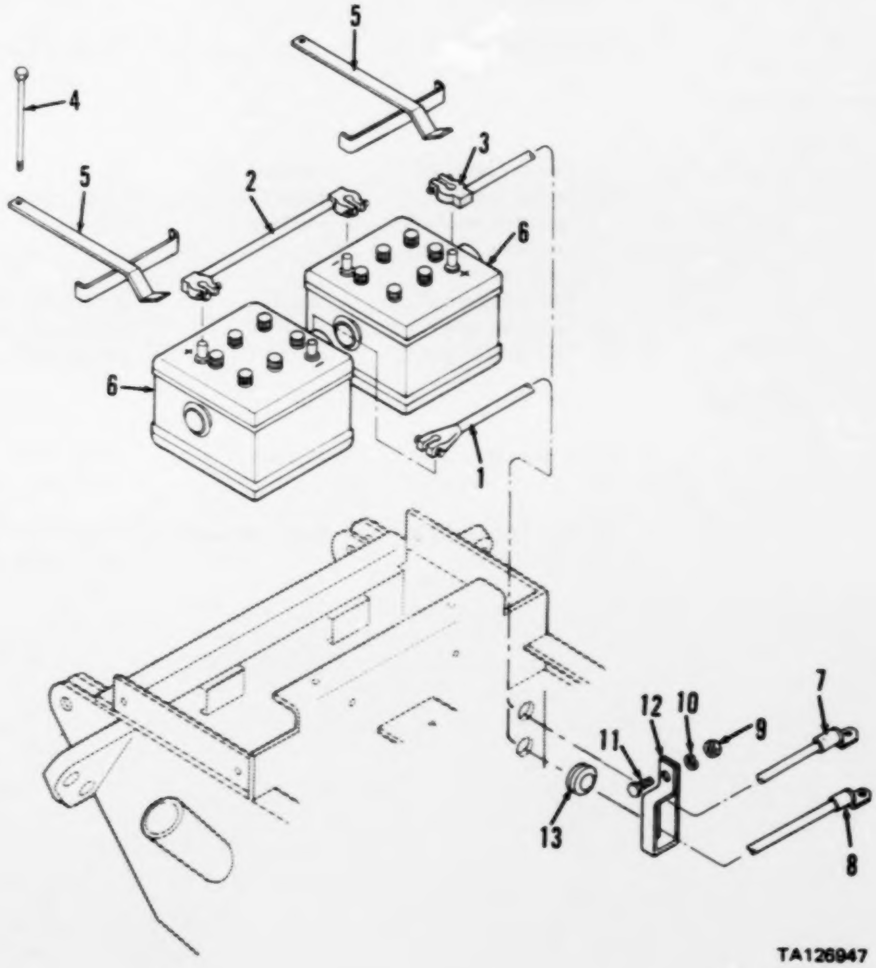
MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	IGNITION switch in OFF position and key removed.
2-52c	Tow bar lowered to ground and radiator grille open.
2-33a	Battery cover removed.



KEY
1. Ground cable clamp
2. Battery cable
3. Positive cable clamp
4. Cap screw
5. Hold-down strap
6. Battery
7. Positive cable terminal
8. Ground cable terminal
9. Nut
10. Lock washer
11. Cap screw
12. Clamp
13. Grommet

2-33. BATTERY SYSTEM MAINTENANCE (cont)

b. Battery Cables and Batteries (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Battery compartment, rear of vehicle	a. Ground cable clamp (1)	Remove from battery post	Loosen clamp nut, spread clamp terminal and lift from battery post
		b. Battery cable clamps (3) and positive cable (2)	Remove from battery posts	Loosen clamp nuts, spread clamp terminals and lift from battery posts
		c. Two cap screws (4)	Loosen and remove	
		d. Two hold-down straps (5)	Remove	Lift from batteries
		e. Two batteries (6)	Remove	Lift from battery compartment
		f. Positive cable terminal (7)	Remove	From starter solenoid B terminal (para 2-27a)
		g. Ground cable terminal (8)	Remove	From starter housing (para 2-27a)
		h. Nut (9), lock washer (10) and cap screw (11)	Remove	From clamp (12)
		i. Clamp (12)	Remove	Spread and lift from harness and battery cables
		j. Two grommets (13) and cables (1 and 3)	Remove	

CLEANING

WARNING

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WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Straps (5), clamp (12) and hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Cables (1, 2 and 3) and grommet (13)	Clean	Wipe with a clean, dry cloth

2-33. BATTERY SYSTEM MAINTENANCE (cont)

b. Battery Cables and Batteries (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		Batteries (6)	Clean	Use clean water on exterior only
5		Battery posts and cable clamps (1, 2 and 3)	Clean	Use a wire brush or crocus cloth to remove deposits
6		Cable terminals (7 and 8)	Clean	Use cleaning solvent P-D-680 on terminals only
INSPECTION				
7		All hardware	Inspect	Replace if worn, or corroded, or if threads damaged
8		Battery cables	Inspect	Replace if insulation frayed, conductors broken, or clamps and terminals damaged
9		Batteries (6)	Inspect	Replace if case cracked or posts damaged
10		Hold-down straps (5)	Inspect	Replace if cracked or corroded
11		Grommet (13)	Inspect	Replace if worn or deteriorated
INSTALLATION/REPLACEMENT				
12	Battery compartment, rear of vehicle	a. Two grommets (13)	Install	
		b. Cables (1 and 3)	Position	
		c. Cable terminals (7 and 8)	Install	Connect to starter on solenoid B terminal (para 2-27a)
		d. Clamp (12)	Position	Around harness and battery cables
		e. Cap screw (11), lock washer (10) and nut (9)	Install and tighten	Until clamp (12) is securely mounted
		f. Two batteries (6)	Install	Lower into battery compartment with posts positioned as shown
		g. Two hold-down straps (5)	Position	On batteries (6)

CAUTION

Do not over-tighten cap screws (4). Excessive tightening will deform battery case and damage battery.

STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Two cap screw (4)	Install and tighten	Until strap (5) is snug against top of battery
		i. Cable clamps (2 and 3)	Install	Position clamp over battery post and tighten clamp nut
		j. Ground cable clamp (1)	Install	Position clamp over negative battery post and tighten clamp nut

2-34. WIRING HARNESS MAINTENANCE

a. Front Wiring Harness.

This task covers:
- a. Cleaning
- b. Inspection
- c. Repair
- d. Testing

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
1		Wiring harness and wire insulation	Clean	Wipe with a clean, dry cloth

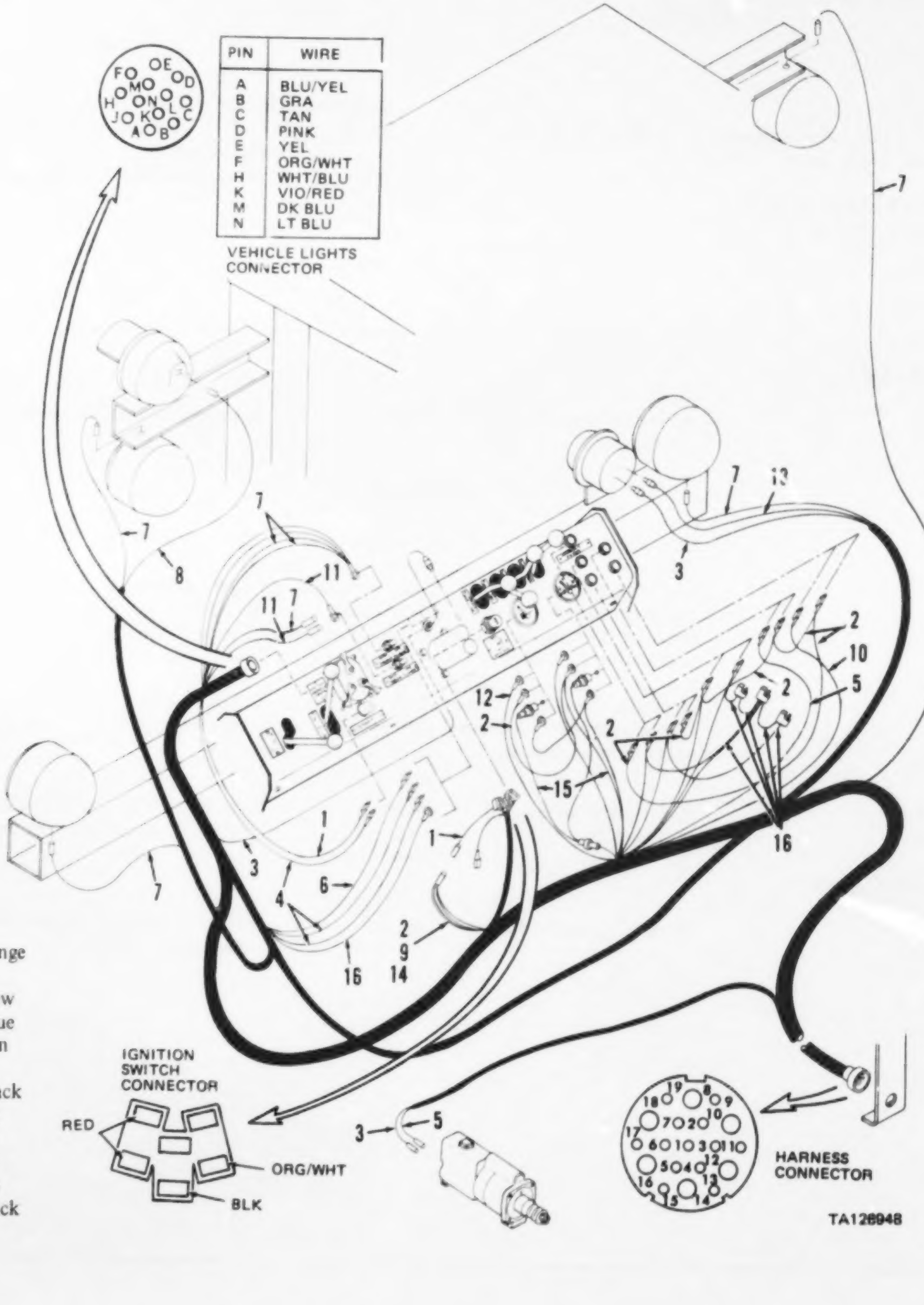
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Electrical terminals and connectors	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
INSPECTION				
3		Wiring harness and wires	Inspect	Repair if insulation frayed, or if conductor broken

2-34. WIRING HARNESS MAINTENANCE (cont)

a. Front Wiring Harness (cont).


F O E
M O D
H O N O
O L O
J O K O C
A O B
VEHICLE LIGHTS CONNECTOR
7
7
13
3
7
8
11
11 7
2
10
5
2
12
2
2
15
16
1
1
3
7
4
6
2
9
14
16
IGNITION SWITCH CONNECTOR
RED
ORG/WHT
BLK
3
5
HARNESS CONNECTOR
19
8
9
18
10
7
2
17
6
1
3
11
10
5
4
12
16
13
15
14
TA126948

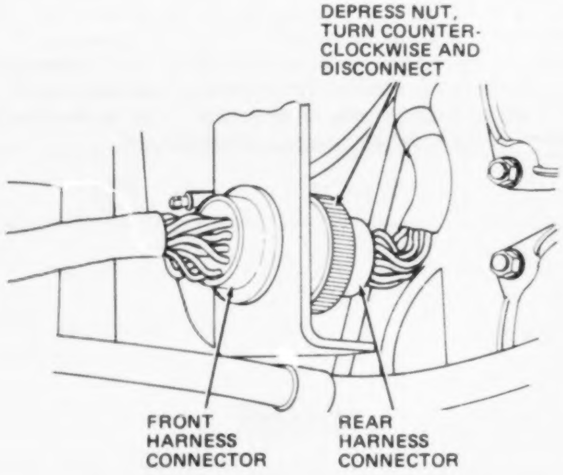
PIN	WIRE
A	BLU/YEL
B	GRA
C	TAN
D	PINK
E	YEL
F	ORG/WHT
H	WHT/BLU
K	VIO/RED
M	DK BLU
N	LT BLU

COLOR
1. Red
2. Purple
3. White-Orange
4. White
5. Blue-Yellow
6. Orange-Blue
7. Dark Green
8. Pink
9. Orange-Black
10. White-Red
11. Dark Blue
12. Tan-Black
13. Pink-White
14. Yellow-Black
15. Gray
16. Black

2-34. WIRING HARNESS MAINTENANCE (cont)

a. Front Wiring Harness (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
4		Harness connector	Disconnect and inspect	Disconnect and remove as shown. Replace harness if connector is defective (refer to direct support maintenance)



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STEP	LOCATION	ITEM	ACTION	REMARKS
5		Other connectors and terminals	Inspect	Replace bent, damaged or missing terminals and connectors
REPAIR				
6		Wiring harness and wires	Tape	Wrap insulating tape over frayed insulation
		NOTE Gage of replacement wire must be greater than or equal to gage of defective wire.		
7		Wiring harness and wires	Replace wire	If defective wire is accessible, cut a length of same gage wire and splice using insulating splice connector. If wire is not accessible, replace wire harness (notify direct support maintenance)
8		Wire terminals and connectors	Replace	Cut wire close to defective terminal, strip insulation to depth of terminal well, and crimp wire to new terminal or connector

2-34. WIRING HARNESS MAINTENANCE (cont)

a. Front Wiring Harness (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

TESTING

NOTE

Testing of the front wiring harness consists of starting the engine, turning on all lights, depressing the service brake pedal, and observing that all lights/indicators/gages are operating. If any abnormal indications are observed, refer to the troubleshooting procedures in this section. To perform a continuity test of the front wiring harness using an ohmmeter, refer to the electrical system wiring schematic located in appendix F.

2-34. WIRING HARNESS MAINTENANCE (cont)

b. Rear Wiring Harness.

This task covers:
a. Cleaning
b. Inspection
c. Repair
d. Testing

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
1		Wiring harness and wire insulation	Clean	Wipe with a clean, dry cloth

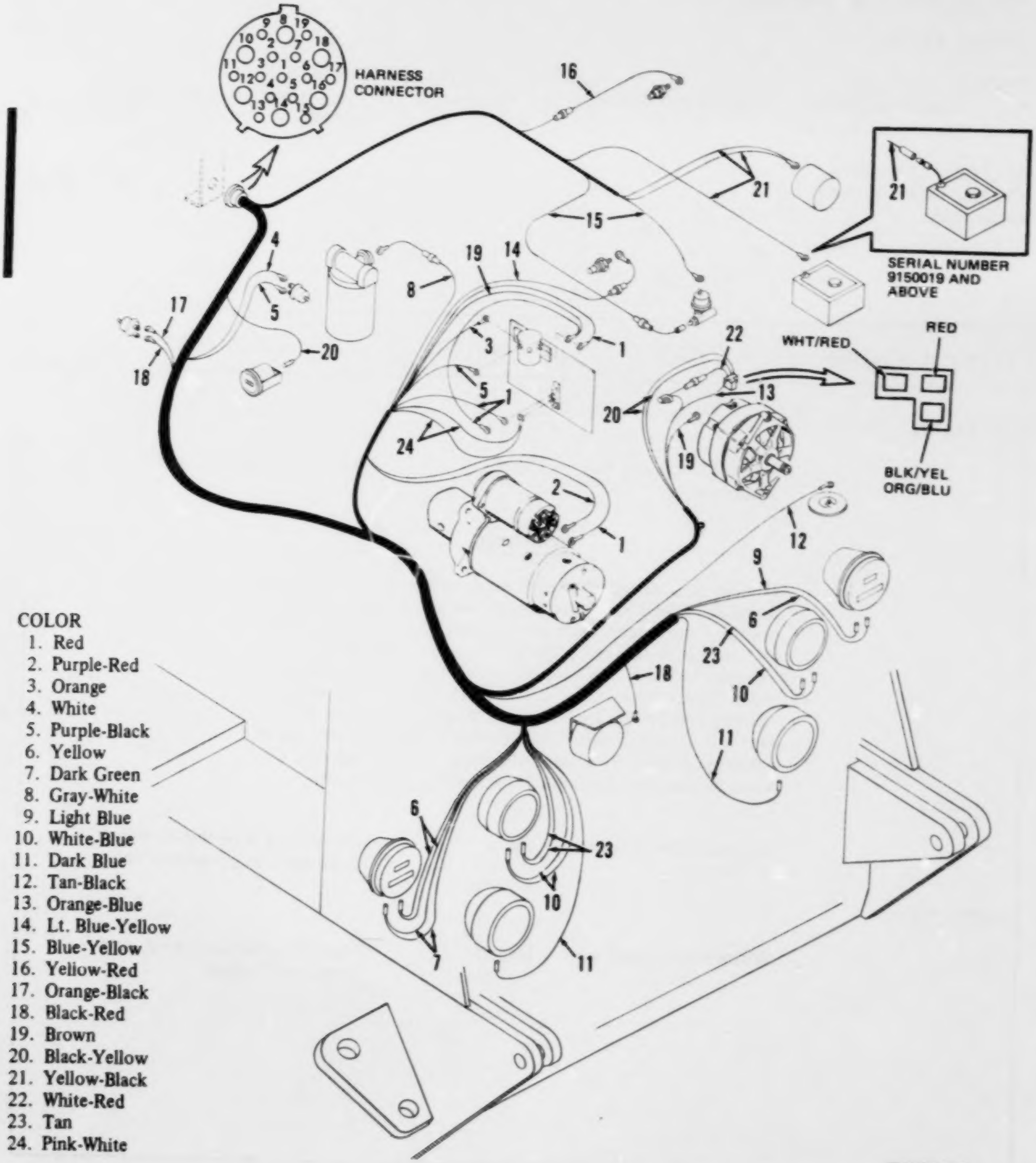
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Electrical terminals and connectors	Clean	Use cleaning solvent P-D-680 on terminals and connectors only
INSPECTION				
3		Wiring harness and wires	Inspect	Repair if insulation frayed, or if conductor broken

2-34. WIRING HARNESS MAINTENANCE (cont)

b. Rear Wiring Harness (cont).


HARNESS CONNECTOR
9 8 19
10 2 7 18
11 3 1 6 17
12 4 5 16
13 14 15
16
21
15
SERIAL NUMBER 9150019 AND ABOVE
4
19
14
8
17
5
3
1
20
18
22
WHT/RED
RED
5
1
13
20
24
19
BLK/YEL ORG/BLU
2
1
12
9
6
23
18
10
11
6
23
10
7
11

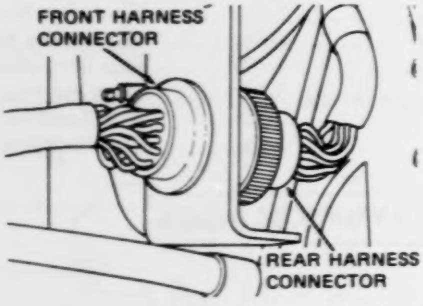
COLOR
1. Red
2. Purple-Red
3. Orange
4. White
5. Purple-Black
6. Yellow
7. Dark Green
8. Gray-White
9. Light Blue
10. White-Blue
11. Dark Blue
12. Tan-Black
13. Orange-Blue
14. Lt. Blue-Yellow
15. Blue-Yellow
16. Yellow-Red
17. Orange-Black
18. Black-Red
19. Brown
20. Black-Yellow
21. Yellow-Black
22. White-Red
23. Tan
24. Pink-White

TA301523

2-34. WIRING HARNESS MAINTENANCE (cont)

b. Rear Wiring Harness (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
4		Harness connector	Disconnect and inspect	Disconnect front harness connector (para 2-34a). Replace harness if connector is defective (notify direct support maintenance)
5		Other connectors and terminals	Inspect	Replace bent, damaged or missing terminals and connectors
REPAIR				
6		Wiring harness and wires	Tape	Wrap insulating tape over frayed insulation
7		Wiring harness and wires	Replace wire	If defective wire is accessible, cut a length of same gage wire and splice using insulated splice connector. If wire is not accessible, replace wiring harness (refer to direct support maintenance)
8		Wire terminals and connectors	Replace	Cut wire close to defective terminal, strip insulation to depth of terminal well, and crimp wire to new terminal or connector
TESTING				



TA126951

NOTE

Gage of replacement wire must be greater than or equal to gage of defective wire.

NOTE

Testing of the rear wiring harness consists of starting the engine, turning on all lights, depressing the service brake pedal, and observing that all lights/indicators/gages are operating. If any abnormal indications are observed, refer to the troubleshooting procedures in this section. To perform a continuity test of the rear wiring harness using an ohmmeter, refer to the electrical system wiring schematic located in appendix F.

Section VI. POWER TRAIN MAINTENANCE

This section contains the information you'll need to maintain the:
- Transmission
- Drive shaft assemblies and universal joints
- Front and rear axles

It gives you instructions on how to troubleshoot problems, and repair or replace the components that are within the scope of organizational maintenance.

Para
Troubleshooting Symptom Index 2-35
Transmission Troubleshooting 2-36
Axles and Drive Shaft Assemblies Troubleshooting . 2-37
Transmission Maintenance 2-38
  Transmission Servicing and Inspection 2-38a
  Transmission Linkage Controls 2-38b
  Axle Disconnect Lever 2-38c
  Dipstick Tube Assembly 2-38d
  Control Valve 2-38e
  Transmission Hoses, Lines and Fittings 2-38f
  Transmission Oil Cooler 2-38g
Axles and Drive Shaft Assemblies Maintenance 2-39
  Front Drive Shaft Assembly and Support Bearing . 2-39a
  Center Drive Shaft Assembly 2-39b
  Rear Drive Shaft Assembly 2-39c
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  Axle Breathers 2-39e
  Front and Rear Axle Shafts and Bearings 2-39f

2-35. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
TRANSMISSION		
Foamy Oil	2-36/1	2-194
Slow or erratic transmission shifting	2-36/2	2-195
High transmission oil temperature	2-36/3	2-196
Loss of drive in all ranges	2-36/4	2-197
Loss of power	2-36/5	2-198
AXLES AND DRIVE SHAFT ASSEMBLIES		
Lubricant leaking from differential breather	2-37/1	2-199
Continuous axle or wheel noise	2-37/2	2-199
Differential carrier assembly overheating	2-37/3	2-200
Lubricant leaking from differential carrier assembly	2-37/4	2-200
Excessive noise or vibration in drive shaft assemblies	2-37/5	2-200

2-36. TRANSMISSION TROUBLESHOOTING

MALFUNCTION
  TEST OR INSPECTION
    CORRECTIVE ACTION

1. FOAMY OIL

Step 1. Check oil level with transmission at operating temperature and engine operating.

a. If oil level is not between FULL and ADD marks, add oil (refer to current lubrication order).

b. If oil level is between FULL and ADD marks, proceed to step 2.

Step 2. Check source of oil and ensure that oil is correct grade and type.

a. If oil is not correct grade and type, drain oil, replace oil filter, and add new oil (para 2-38a) (refer to current lubrication order).

b. If oil is correct grade and type, proceed to step 3.

2-36. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. FOAMY OIL (cont)

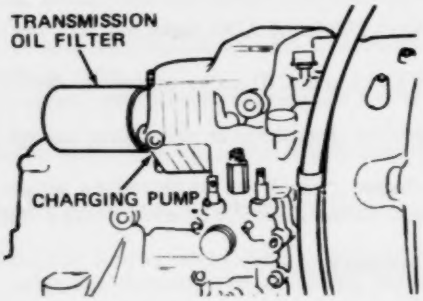
Step 3. Remove transmission oil level dipstick and check for water on dipstick.

a. If water is on dipstick, drain oil, replace oil filter, and add new oil (para 2-38a) (refer to current lubrication order).

b. If water is not on dipstick, proceed to step 4.

Step 4. Check if charging pump mounting bolts are loose.

If charging pump mounting bolts are loose, tighten them.



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2. SLOW OR ERRATIC TRANSMISSION SHIFTING

Step 1. Check oil level with transmission at operating temperature and engine operating.

a. If oil level is not between FULL and ADD marks, add oil (refer to current lubrication order).

b. If oil level is between FULL and ADD marks, proceed to step 2.

Step 2. Check oil filter for leakage and/or damage.

a. If oil filter is leaking, tighten; if damaged, replace (para 2-38a).

b. If oil filter is not leaking or damaged, proceed to step 3.

Step 3. Remove screen assembly and check if dirty or damaged (para 2-38a).

a. If screen assembly is dirty, clean; if damaged, replace (para 2-38a).

b. If screen assembly checks okay, proceed to step 4.

2-36. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. SLOW OR ERRATIC TRANSMISSION SHIFTING (cont)

Step 4. Check transmission linkage for proper adjustment or damage (para 2-38b).

a. If transmission linkage is not adjusted properly, adjust; if damaged, repair by replacing the damaged part or parts (para 2-38b).

b. If transmission linkage is okay, check speed control cable for damage; replace if necessary (para 2-38b).

3. HIGH TRANSMISSION OIL TEMPERATURE

Step 1. Check oil level with transmission at operating temperature and engine operating.

a. If oil level is not between FULL and ADD marks, add oil (refer to current lubrication order).

b. If oil level is between FULL and ADD marks, proceed to step 2.

Step 2. Check transmission oil cooler for clogged fins or obstruction, leakage, or damage.

a. If oil cooler fins are clogged, clean; if fins are obstructed, remove obstructions. If oil cooler is leaking or damaged, replace oil cooler (para 2-38g).

b. If oil cooler is okay, proceed to step 3.

Step 3. Check hoses and lines between transmission and oil cooler for leakage or damage.

a. If hoses and lines between transmission and oil cooler are leaking or damaged, replace (para 2-38f).

b. If hoses and lines between transmission and oil cooler are okay, proceed to step 4.

Step 4. Check transmission temperature indicator and switch (electrical system) (para 2-25 and 2-31c, respectively).

a. If transmission temperature indicator is defective, replace it (para 2-28e); if transmission temperature switch is defective, replace it (para 2-31c).

b. If transmission temperature indicator and switch are okay, proceed to step 6.

Step 5. Check oil filter for leakage or damage.

a. If oil filter is leaking, tighten it; if damaged, replace it (para 2-38a).

b. If oil filter is okay, remove screen assembly (para 2-38a) and check it for damage or clogged condition. Replace screen assembly if damaged; clean if clogged (para 2-38a).

2-36. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. LOSS OF DRIVE IN ALL RANGES

Step 1. Check oil level with transmission at operating temperature and engine operating.

a. If oil level is not between FULL and ADD marks, add oil (refer to current lubrication order).

b. If oil level is between FULL and ADD marks, proceed to step 2.

Step 2. Check if axle disconnect lever is in disengaged position (pulled outward).

a. If axle disconnect lever is in disengaged position (pulled outward), place in engaged position.

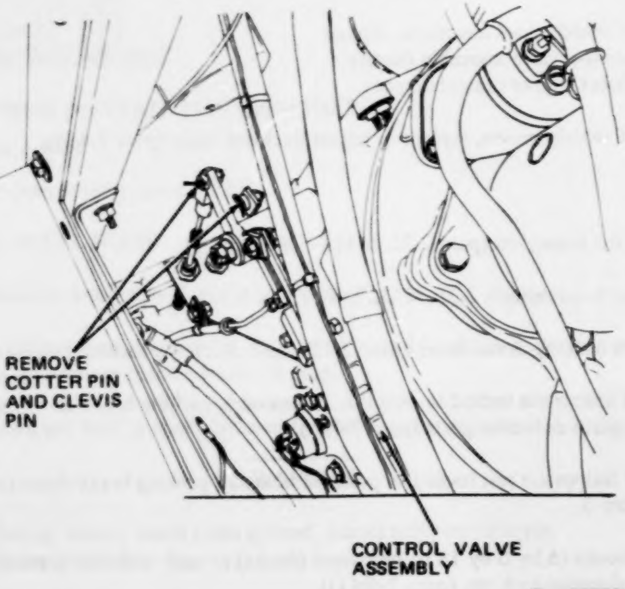
b. If axle disconnect lever is in engaged position, proceed to step 3.

Step 3. Observe control valve assembly linkage while an assistant moves direction selector and speed selector through their entire range.
Movement of control valve assembly forward and reverse and speed selector spools should be observed.

a. If movement is not observed, replace/repair cables/linkages (para 2-38b).

b. If movement is observed, proceed to step 4.

Step 4. Disconnect linkage at control valve assembly valve spools.
Start engine, operate at idle speed, and set parking brake.



NOTE

Do not depress service brake pedal. Depressing service brake pedal activates declutch valve in turn neutralizing transmission.

2-36. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

4. LESS OF DRIVE IN ALL RANGES (cont)

Step 4. (cont)

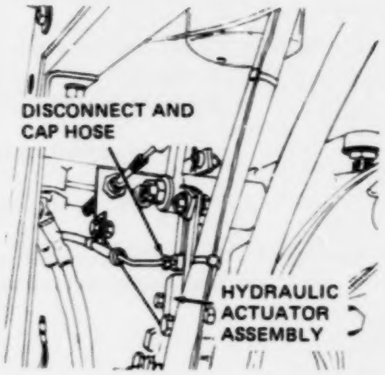
With an assistant in operator's seat, move control valve assembly direction selector spool and speed selector spool slowly through their entire range of travel.
Movement of vehicle should be observed.

a. If vehicle moves, adjust transmission linkage controls (para 2-38b).

b. If vehicle does not move, proceed to step 5.

Step 5. Disconnect and cap hose connected to control valve assembly hydraulic actuator assembly.
Start engine and operate at idle speed and set parking brake.
With an assistant in operator's seat, move control valve assembly direction selector spool and speed selector spool slowly through their entire range of travel.
Movement of vehicle should be observed.

a. If vehicle does not move, replace control valve assembly (notify direct support maintenance).



TA126954

b. If vehicle moves, replace or adjust declutch valve (para 2-43d).

5. LOSS OF POWER

Step 1. Check for foamy oil (para 2-36, MALFUNCTION 1).

Refer to paragraph 2-36, MALFUNCTION 1.

Step 2. Remove parking brake drum (para 2-42b) and check for locked parking brake linings.

a. If linings are locked in position, disassemble parking brake and inspect parts (para 2-42b); replace defective parts (para 2-42b).

b. If linings are not locked in position, reinstall parking brake drum (para 2-42b) and proceed to step 3.

Step 3. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving.
Install shipping lock pin (para 2-4b(1)).
Ensure that parking brake lever is in released position.

2-36. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. LOSS OF POWER (cont)

Step 3. (cont)

WARNING

Before raising wheel off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle off ground.
Rotate wheel by hand and check that wheel rotates freely without excessive drag.
Repeat for remaining wheel.
Repeat for remaining axle.

a. If a wheel does not rotate freely without excessive drag or is locked, adjust brakes (para 2-43a).

b. If wheels rotate freely, lower axle to ground, remove shipping lock pin and blocks. Check drive shafts and universal joints for damage (para 2-39); repair or replace as necessary (para 2-39).

2-37. AXLES AND DRIVE SHAFT ASSEMBLIES TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. LUBRICANT LEAKING FROM DIFFERENTIAL BREATHER

Check oil level (para 2-39d).

Drain to proper level (para 2-39d).

2. CONTINUOUS AXLE OR WHEEL NOISE

Step 1. Check lubricant level (para 2-39d).

a. If lubricant level is below fill plug opening, add lubricant (refer to current lubrication order) to fill plug opening then reinstall fill plug.

b. If lubricant level is okay, proceed to step 2.

WARNING

Before raising wheel from ground, install shipping lock pin (para 2-4b(1)).

Step 2. Check wheel bearing for proper adjustment (raise wheel and use pry bar to check for any noticeable end play) or damage.
Repeat for other wheels.

2-37. AXLES AND DRIVE SHAFT ASSEMBLIES TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. CONTINUOUS AXLE OR WHEEL NOISE (cont)

Step 2. (cont)

a. If end play is noticeable, adjust or replace wheel bearing (para 2-39f).

b. If end play is okay, proceed to step 3.

Step 3. Check axle shafts for damage (para 2-39f).

a. If axle shafts damaged, replace (para 2-39f).

b. If axle shafts are not damaged, notify direct support maintenance.

3. DIFFERENTIAL CARRIER ASSEMBLY OVERHEATING

Check lubricant level (para 2-39d).

Add lubricant (para 2-39d).

4. LUBRICANT LEAKING FROM DIFFERENTIAL CARRIER ASSEMBLY

Check axle breather for damage or clogged condition (para 2-39e).

a. If axle breather is damaged or clogged, clean or replace it (para 2-39e).

b. If axle breather is okay, notify direct support maintenance.

5. EXCESSIVE NOISE OR VIBRATION IN DRIVE SHAFT ASSEMBLIES

Step 1. Check for loose universal joint mounting bolts (para 2-39a, b and c).

a. If universal joint mounting bolts are loose, tighten (para 2-39a, b and c).

b. If universal joint mounting bolts are tight, proceed to step 2.

Step 2. Check drive shaft assemblies for insufficient lubrication, wear or damage (indicated by excessive movement between universal joint and drive shaft assembly in any direction).

a. If drive shaft assemblies are insufficiently lubricated, lubricate (para 2-39a, b and c); if worn or damaged, repair or replace drive shaft assembly (para 2-39a, b and c).

b. If drive shaft assemblies are lubricated and are not worn or damaged, check for a bent drive shaft assembly (para 2-39a, b and c). Replace a bent drive shaft assembly (para 2-39a, b and c).

2-38. TRANSMISSION MAINTENANCE

a. *Transmission Servicing and Inspection.*

(1) Draining and Refilling Transmission Oil. This task covers draining and refilling transmission oil.

INITIAL SETUP

TOOLS

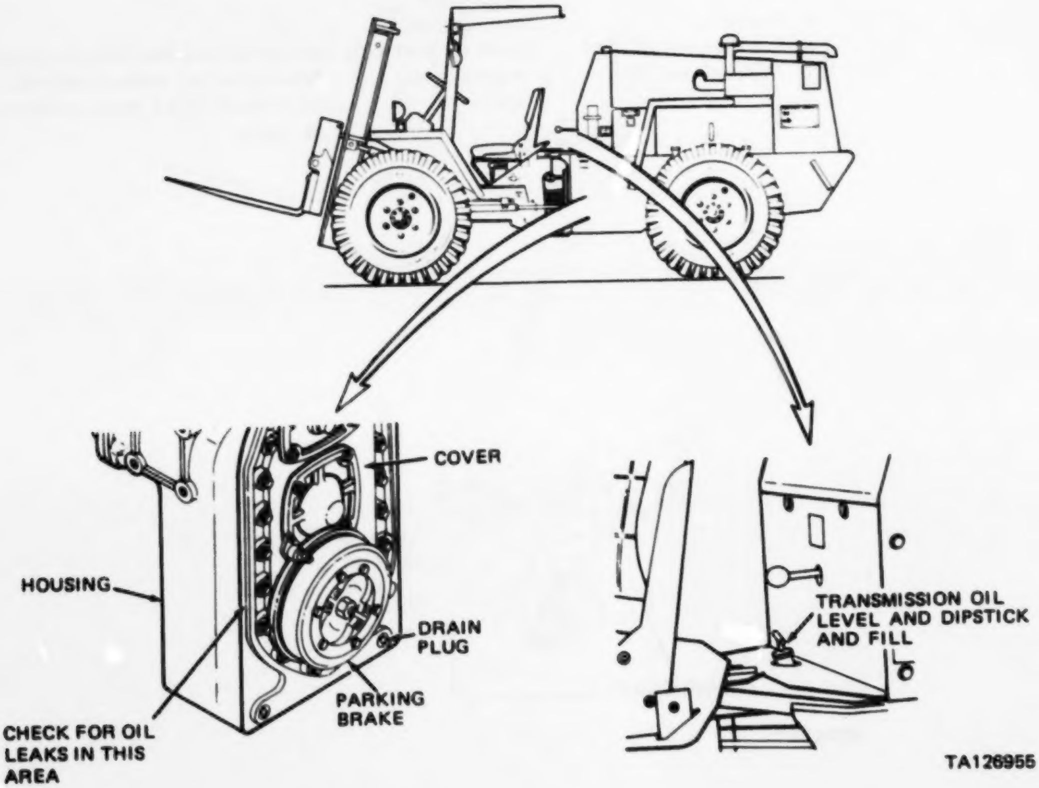
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Transmission oil (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine operated for 15 minutes immediately prior to draining oil. Engine off, vehicle parked on level surface and parking brake applied.
2-53c	Left and right side panels removed.


COVER
HOUSING
DRAIN PLUG
PARKING BRAKE
CHECK FOR OIL LEAKS IN THIS AREA
TRANSMISSION OIL LEVEL AND DIPSTICK AND FILL
TA126955

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(1) Draining and Refilling Transmission Oil (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Transmission	a. Transmission oil drain plug	Remove	Position 7 gallon container under drain plug before removing
		b. Transmission oil	Drain	
		c. Screen assembly	Remove and clean	Para 2-38a(2)
		d. Air breather	Remove and clean	Para 2-38a(3)
		e. Oil filter	Remove and discard	Para 2-38a(4)
		f. Transmission oil drain plug	install	
2	Operator's compartment, rear	a. New oil filter	Install	Para 2-38a(4)
		b. Air breather	Install	Para 2-38a(3)
		c. Screen assembly	Install	Para 2-38a(2)
		d. Transmission oil fill	Fill to dipstick LOW mark	Refer to current lubrication order
		e. Engine	Start and idle	
		f. Transmission oil level dipstick and fill	Check oil level with engine at idle speed	Add oil to reach low mark if necessary. When oil is hot, recheck oil level. Add oil to reach FULL mark on dipstick, if necessary

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(2) Screen Assembly. This task covers removal, cleaning, and installation of screen assembly.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

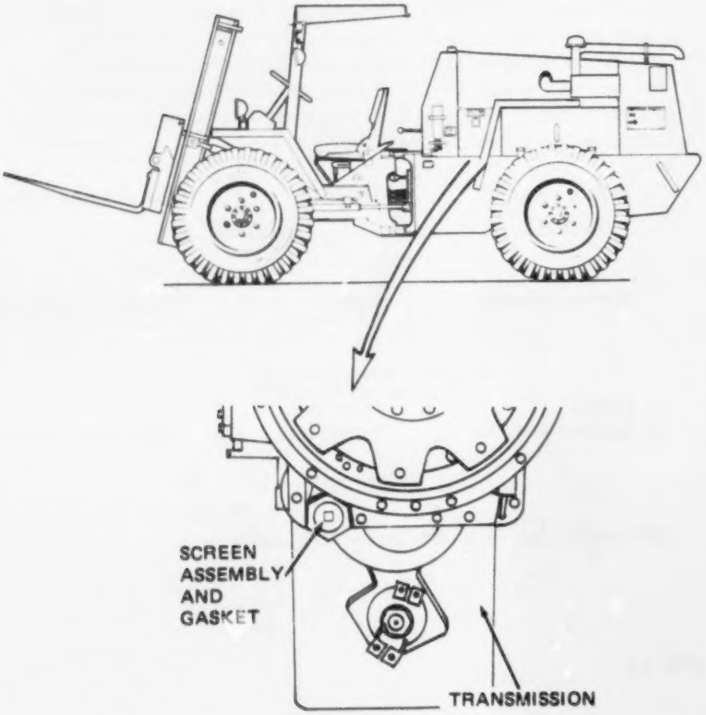
EQUIPMENT CONDITION

Paragraph	Condition Description
2-38a(1)	Transmission oil drained.

MATERIALS/PARTS

Cleaning solvent P-D-680

Gasket



TA126956

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(2) Screen Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission	a. Screen assembly b. Gasket	Remove Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Screen assembly	Clean	Use cleaning solvent P-D-680
INSPECTION				
3		Screen assembly	Inspect	Replace if torn, broken or dented
INSTALLATION				
4	Transmission	a. Gasket b. Screen	Position Install	Tighten to 10 to 15 pounds foot torque

NOTE

Fill transmission with oil (para 2-38a(1), step 2).

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(3) Air Breather. This task covers removal, cleaning, inspection, and installation of air breather.

INITIAL SETUP

TOOLS

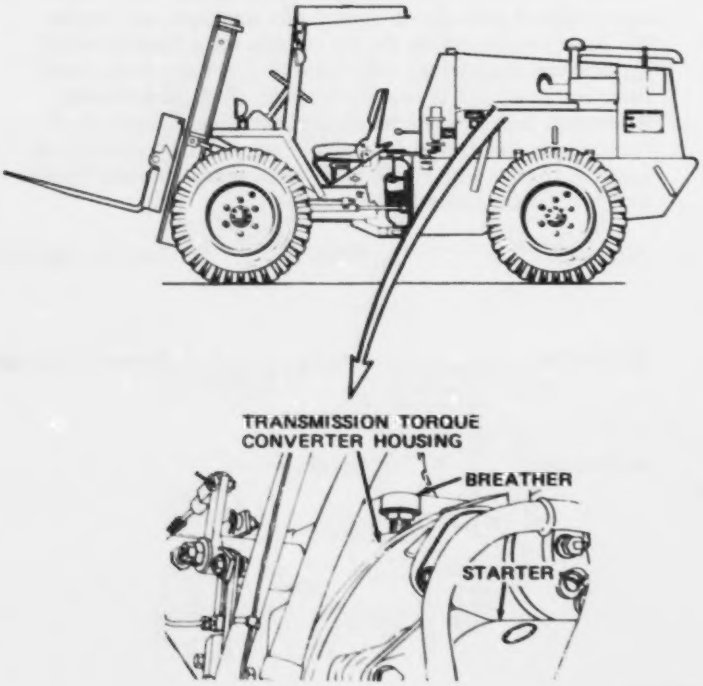
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-53c	Left side panel removed.


TRANSMISSION TORQUE CONVERTER HOUSING
BREATHER
STARTER

TA126957

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(3) Air Breather (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission torque converter housing, top	Air breather	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		Air breather	Clean	Use cleaning solvent P-D-680
INSPECTION				
3		Air breather	Inspect	Replace if damaged or clogged
INSTALLATION				
4	Transmission torque converter housing, top	Air breather	Install	

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(4) Oil Filter. This task covers replacement of transmission oil filter.

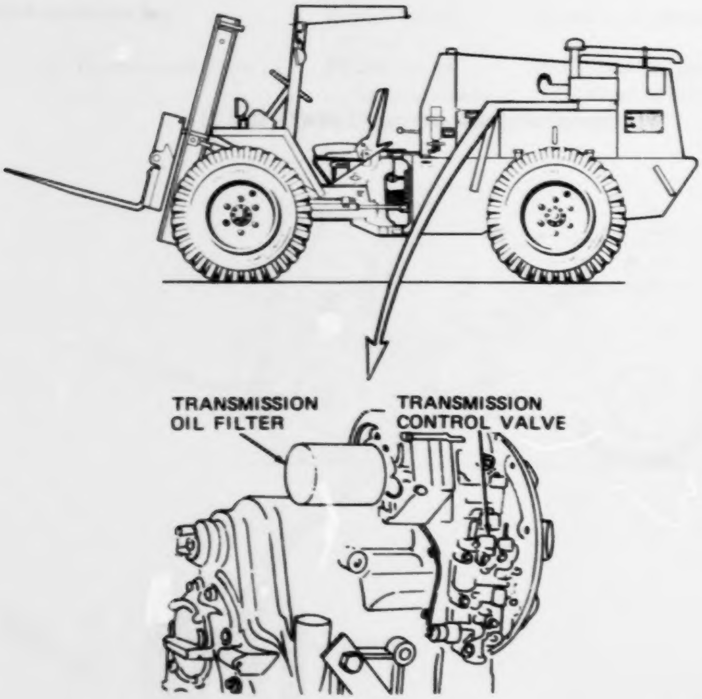
INITIAL SETUP

TOOLS
Clamping Type Oil Filter Wrench

MATERIALS/PARTS
Clean transmission oil (refer to current lubrication order)
Oil filter

EQUIPMENT CONDITION

Paragraph	Condition Description
2-38a(1)	Transmission oil drained.


TRANSMISSION OIL FILTER
TRANSMISSION CONTROL VALVE

TA127502

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(4) Oil Filter (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission	Oil filter	Remove and discard	Use clamp type wrench
INSTALLATION				
2	Transmission	Oil filter gasket	Coat	Use clean transmission oil
3	Transmission	Oil filter	Install	Install until gasket contacts base. Then, tighten oil filter one-half to three-quarters of a turn to obtain proper seal

NOTE

Fill transmission with oil (para 2-38a(1), step 2).

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(5) Inspection. This task covers inspection of the transmission.

INITIAL SETUP

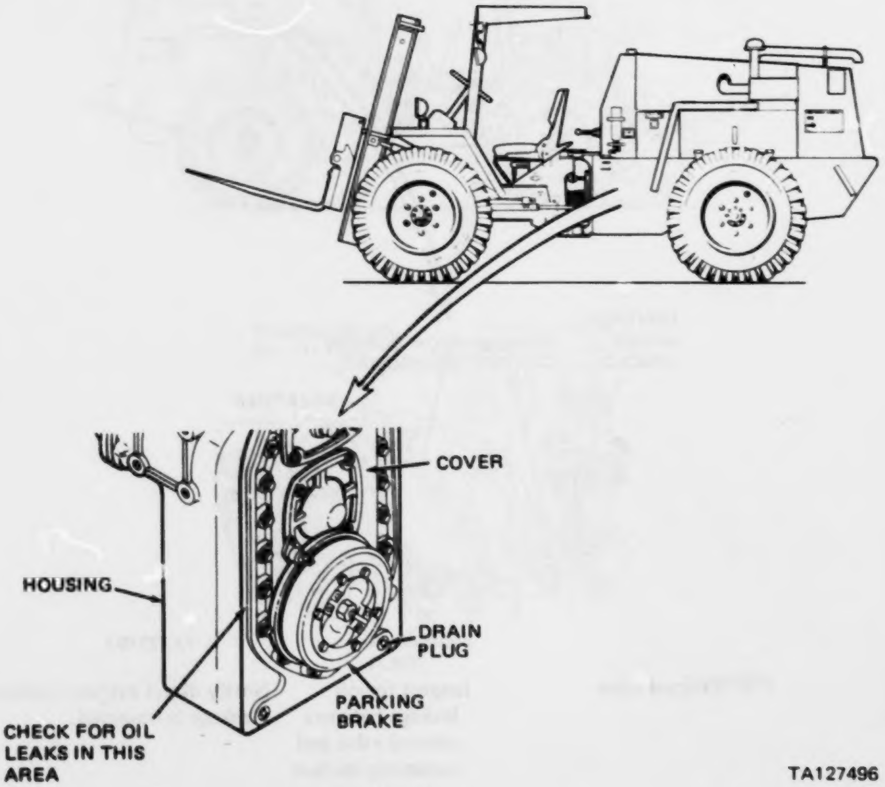
TOOLS
None

MATERIALS/PARTS
None

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off, vehicle parked on level surface and parking brake applied.
2-53c	Left and right side panels removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Transmission, front	a. Drain plug	Inspect for oil leakage	Tighten if oil leakage is observed
		b. Transmission cover	Inspect for oil leakage between cover and housing	Notify direct support maintenance if oil leakage observed



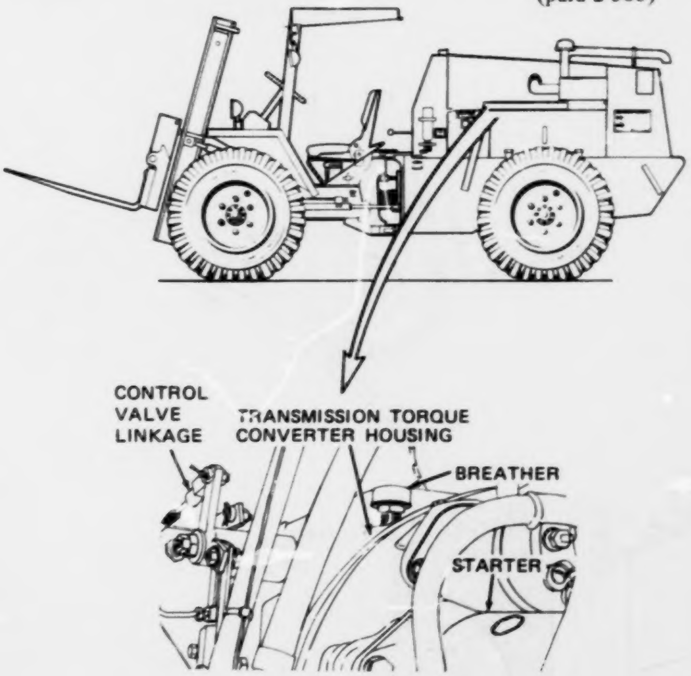
TA127496

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(5) Inspection (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
2	Transmission, top	a. Breather	Inspect for dirty condition, oil leakage	Clean if dirty (para 2-38a(3)); tighten if oil leakage is observed
		b. Torque converter housing	Inspect for oil leakage between converter housing and transmission housing	Notify direct support maintenance if oil leakage is observed
		c. Control valve linkage	Inspect for missing or loose parts	While an assistant moves transmission levers through their entire range, check that spools move. If parts are missing or loose or if spools do not move, repair (para 2-38b)
		d. Control valve	Inspect for oil leakage between control valve and mounting surface and at top of control valve	Notify direct support maintenance if oil leakage is observed.



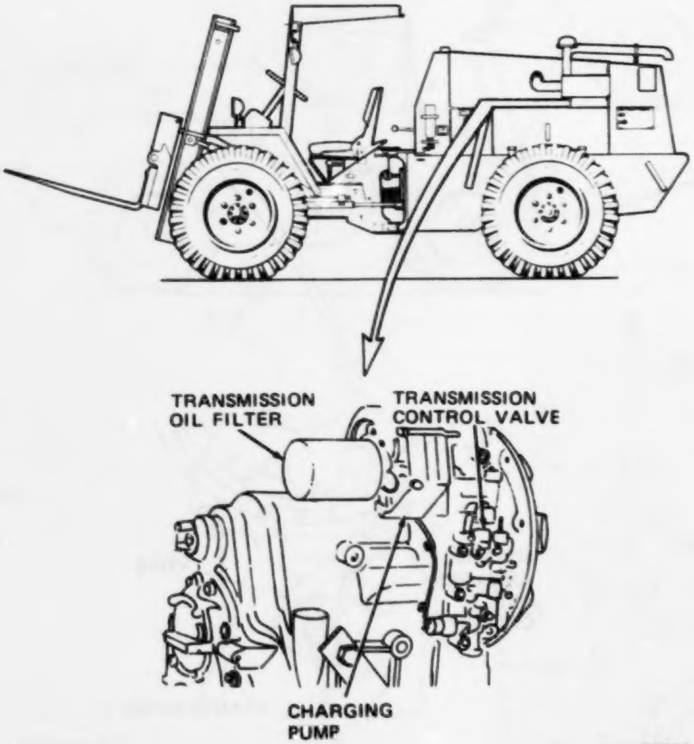
TA127497

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(5) Inspection (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
2 (cont)		e. Oil filter	Inspect for oil leakage at base	Tighten oil filter if leakage is observed
		f. Charging pump	Inspect for oil leakage between pump and mounting surface	If oil leakage is observed, tighten pump mounting bolts; if bolts are tight, notify direct support maintenance


TRANSMISSION OIL FILTER
TRANSMISSION CONTROL VALVE
CHARGING PUMP

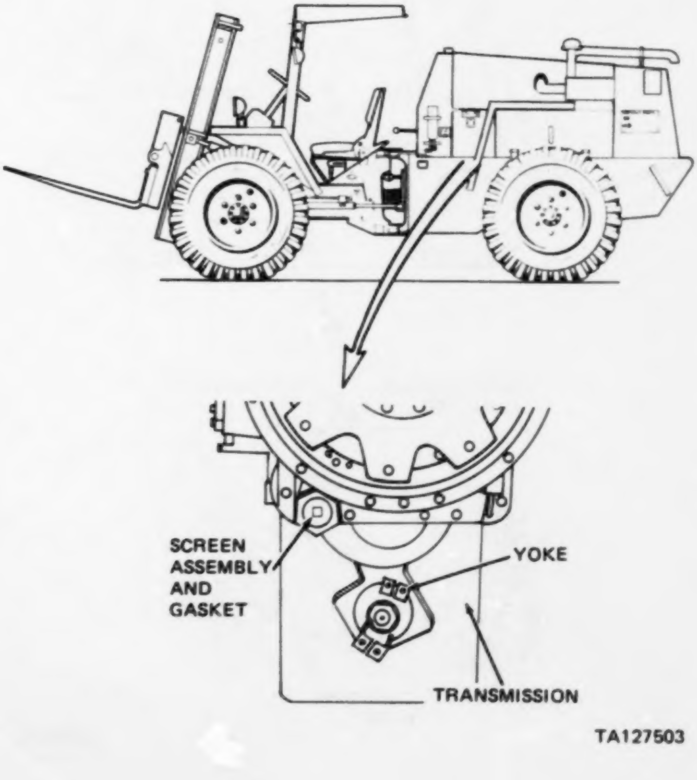
TA126958

2-38. TRANSMISSION MAINTENANCE (cont)

a. Transmission Servicing and Inspection (cont).

(5) Inspection (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
3	Transmission, bottom, rear	a. Screen assembly	Inspect for oil leakage	Tighten screen assembly to 10-15 pounds foot torque if oil leakage is observed; if screen assembly is tight, replace gasket (para 2-38a(2))
		b. Yoke area	Inspect for oil leakage	Notify direct support maintenance if oil leakage is observed



TA127503

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls.

This task covers:
a. Removal
b. Cleaning
c. Inspection/Repair
d. Installation/Replacement
e. Adjustment

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

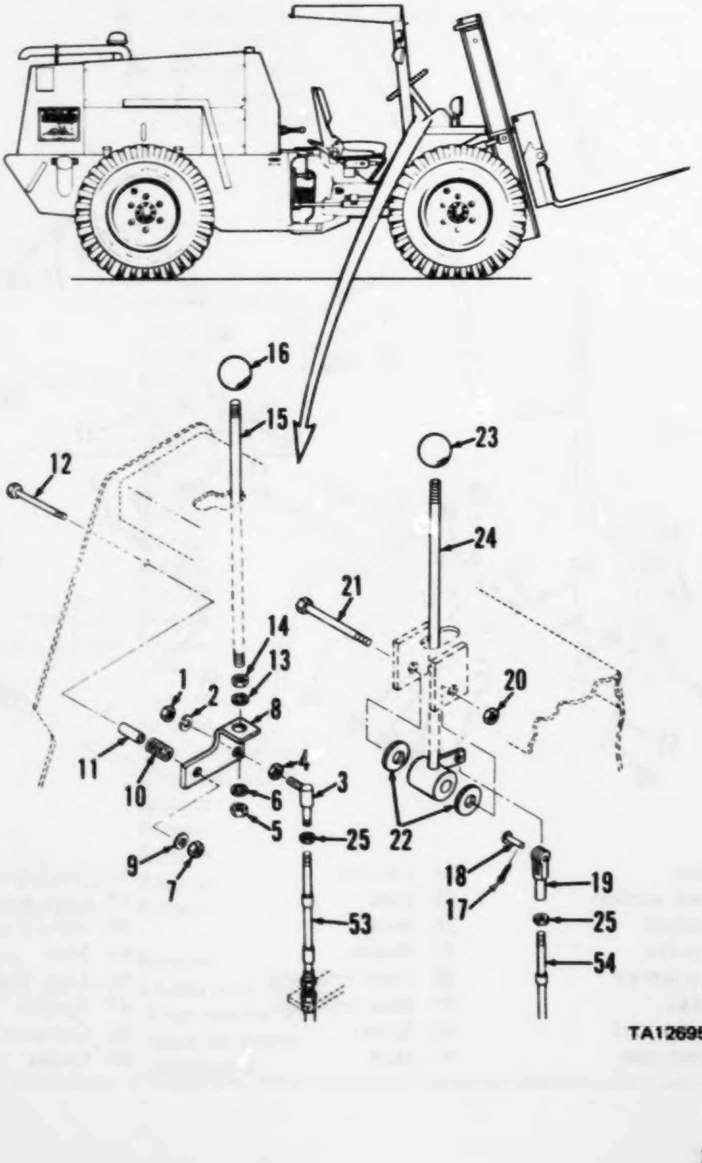
Clean diesel fuel
Cleaning solvent P-D-680

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off and parking brake applied.
2-53c	Left side panel removed.
2-53e	Left hood support plate removed.
2-53h	Noise baffle mat removed.
2-53i	Chassis guard removed.

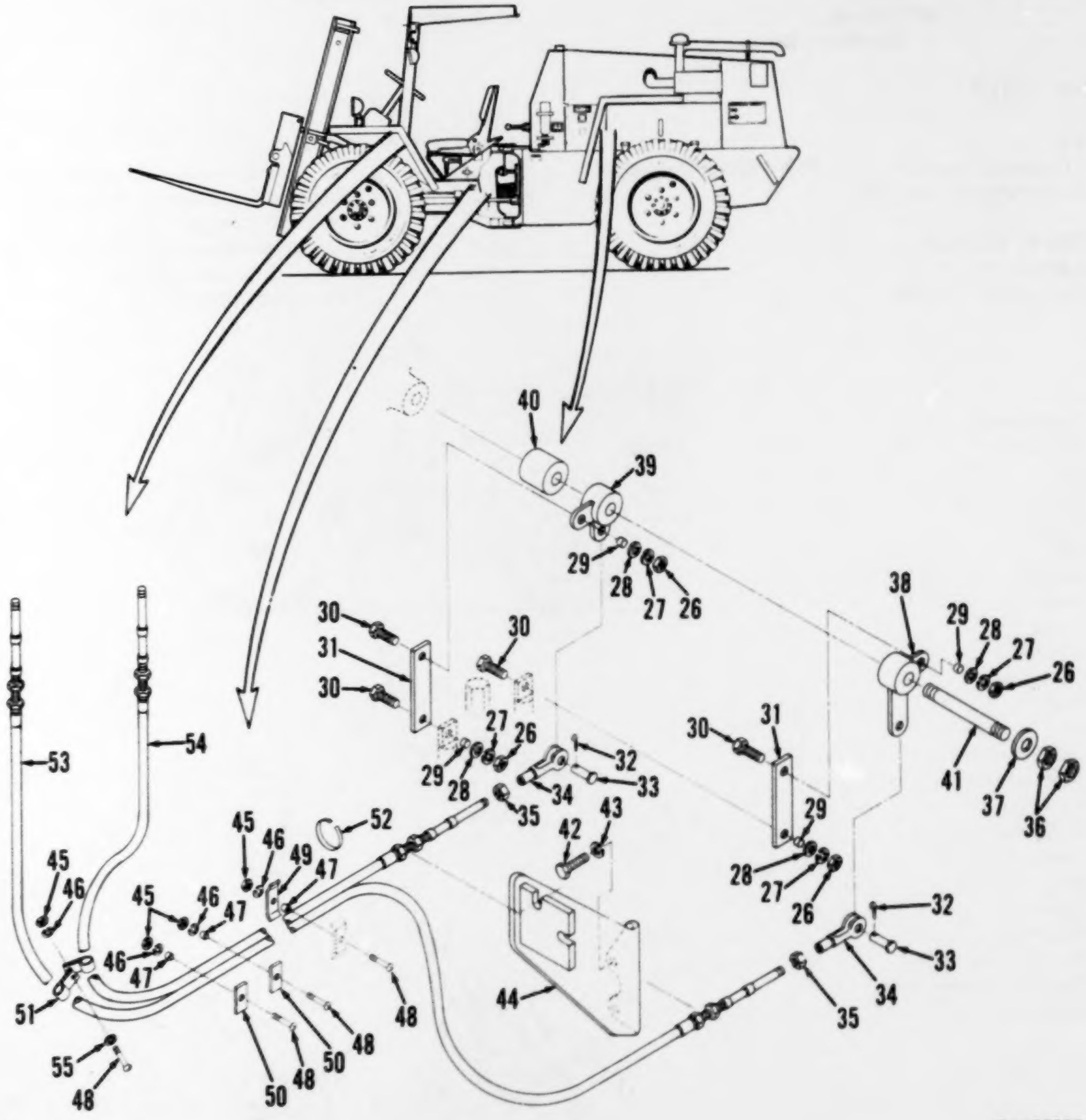
KEY

1. Nut
2. Lock washer
3. Ball joint
4. Nut
5. Nut
6. Washer
7. Nut
8. Bracket
9. Washer
10. Spring
11. Spacer
12. Cap screw
13. Washer
14. Nut
15. Speed control lever
16. Control lever knob
17. Cotter pin
18. Clevis pin
19. Clevis
20. Nut
21. Cap screw
22. Washers
23. Control lever knob
24. Direction control lever
25. Nuts



2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).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KEY

26. Nuts
27. Lock washers
28. Washers
29. Spacers
30. Cap screws
31. Links
32. Cotter pins
33. Clevis pins
34. Clevises
35. Nuts
36. Nuts
37. Washer
38. Outer bellcrank
39. Inner bellcrank
40. Spacer
41. Stud
42. Cap screws
43. Lock washers
44. Cable bracket
45. Nuts
46. Lock washers
47. Spacers
48. Cap screws
49. Clamp
50. Cable hold down plates
51. Cable clamps
52. Tie straps
53. Cable
54. Cable
55. Washer

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Instrument panel, bottom, transmission control levers	a. Speed control lever	Inspect for loose or missing parts	Tighten loose parts; replace missing parts
		b. Direction control lever	Inspect for loose or missing parts	Tighten loose parts; replace missing parts
2	Engine compartment	Linkage (at control valve)	a. Inspect for loose or missing parts	Tighten loose parts; replace missing parts
			b. Check that when levers are moved, linkage causes control valve spools to move	If necessary, disassemble and inspect parts if control valve spools do not move
REMOVAL				
1	Instrument panel, bottom, speed control lever	a. Nut (1)	Remove	
		b. Lock washer (2)	Remove	
		c. Ball joint (3)	Detach and remove	From cable (53)
		d. Nut (4)	Remove from ball joint (3)	
		e. Nut (5)	Remove	
		f. Two washers (6 and 13)	Remove	
		g. Nut (7)	Remove and support bracket (8)	
		h. Washer (9)	Remove	
		i. Bracket (8)	Remove	
		j. Spring (10)	Remove	
		k. Spacer (11)	Remove	
		l. Cap screw (12)	Remove	
		m. Nut (14)	Remove	
		n. Speed control lever (15)	Remove	
		o. Control lever knob (16)	Remove	
2	Instrument panel, bottom, direction control lever	a. Cotter pin (17)	Remove	
		b. Clevis pin (18)	Remove	
		c. Clevis (19)	Detach and remove from cable (54)	
		d. Nut (20)	Remove	
		e. Cap screw (21)	Remove	
		f. Two washers (22)	Remove	
		g. Control lever knob (23)	Remove	
		h. Direction control lever (24)	Remove	
		i. Two nuts (25)	Remove	
		j. Two cables (53 and 54)	Loosen nuts, detach from bracket and mark for proper installation	

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3	Engine compartment	Cables (53, 54)	Mark for proper installation	
4	Link (31)	a. Four nuts (26)	Remove	
		b. Four lock washers (27)	Remove	
		c. Four washers (28)	Remove	
		d. Four spacers (29)	Remove	
		e. Four cap screws (30)	Remove	
		NOTE Remove four nuts (26), lock washers (27), washers (28), spacers (29) and cap screws (30) from two links (31).		
5	Outer bellcrank (38), inner bellcrank (39)	a. Two links (31)	Remove	
		b. Two cotter pins (32)	Remove	
		c. Two clevis pins (33)	Remove	
		d. Two clevises (34)	Slide off and remove	
		e. Two nuts (35)	Remove	
6	Transmission	a. Two nuts (36)	Remove	
		b. Washer (37)	Remove	
		c. Outer bellcrank (38)	Remove	
		d. Inner bellcrank (39)	Remove	
		e. Spacer (40)	Remove	
		f. Stud (41)	Remove	
		g. Two cap screws (42)	Remove	
		h. Two lock washers (43)	Remove	
		i. Cable bracket (44)	Remove	
7	Operator's compartment, under floor panel	a. Four nuts (45)	Remove	
		b. Four lock washers (46)	Remove	
		c. Three spacers (47)	Remove	
		d. Four cap screws (48)	Remove	
		e. Washer (55)	Remove	
		f. Clamp (49)	Remove	
		g. Two cable hold down plates (50)	Remove	
		h. Two cable clamps (51)	Remove	
		i. Two tie straps (52)	Remove	
		j. Two cables (53 and 54)	Remove	

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
8		Cables (53, 54) and control lever balls (16, 23)	Clean	Use clean diesel fuel. Dry thoroughly

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
9		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly
INSPECTION/REPAIR				
10		Cables (53, 54)	Inspect	Replace if cracked, worn, damaged, twisted or distorted
11		Spring (10)	Inspect	Replace if cracked, worn, damaged, distorted or permanently set
12		All other parts	Inspect	Replace if cracked, worn, damaged, distorted, or missing or damaged threads
INSTALLATION/REPLACEMENT				
13	Operator's compartment, under floor panel	a. Two cables (53, 54)	Position	
		b. Two tie straps (52)	Install	
		c. Two cable clamps (51)	Position	
		d. Two cable hold down plates (50)	Position	
		e. Three spacers (47)	Install	
		f. Clamp (49)	Position	
		g. Washer (55)	Position	
		h. Four cap screws (48)	Install	
		i. Four lock washers (46)	Install	
		j. Four nuts (45)	Install	
14	Transmission	a. Cable bracket (44)	Position	
		b. Two lock washers (43)	Position	
		c. Two cap screws (42)	Install	
		d. Stud (41)	Install	
		e. Spacer (40)	Position	

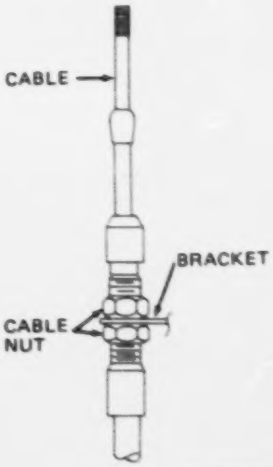
2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
14 (cont)		f. Inner bellcrank (39)	Position	
		g. Outer bellcrank (38)	Position	
		h. Washer (37)	Position	
		i. Two nuts (36)	Install	
15	Outer bellcrank (38), inner bell-crank (39)	a. Two nuts (35)	Install on cables (53, 54)	
		b. Two clevises (34)	Install and position	
		c. Two clevis pins (33)	Install	
		d. Two cotter pins (32)	Install	
		e. Two links (31)	Position	
16	Link (31)	a. Four cap screws (30)	Install	
		b. Four spacers (29)	Install	
		c. Four washers (28)	Install	
		d. Four lock washers (27)	Install	
		e. Four nuts (26)	Install	
		NOTE Install four cap screws (30), spacers (29), washers (28), lock washers (27) and nuts (26) to attach links (31) to control valve spools, outer bellcrank (38) and inner bellcrank (39).		
17	Instrument panel	a. Two cables (53, 54)	Attach to bracket and tighten cable nuts	
		b. Two nuts (25)	Install on cables (53, 54)	
		c. Control lever (24)	Install	
		d. Control lever knob (23)	Install	
		e. Control lever (24)	Position between two brackets	
		f. Two washers (22)	Position	
		g. Cap screw (21)	Install	
		h. Nut (20)	Install	
		i. Clevis (19)	Install in cable (54) and position lever (24) tab	
		j. Clevis pin (18)	Install	
		k. Cotter pin (17)	Install	
		l. Control lever knob (16)	Install	
		m. Speed control lever (15)	Install	
		n. Nut (14)	Install on speed control lever (15)	
		o. Cap screw (12)	Install	
		p. Spacer (11)	Install	
		q. Spring (10)	Install	
		r. Bracket (8)	Install	
		s. Washer (9)	Install	

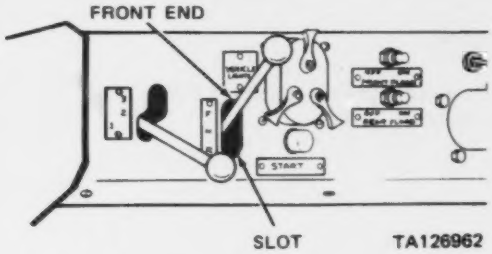
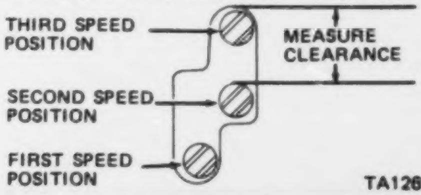
2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
18	Instrument panel, speed control lever area	a. Nut (7)	Install	
		b. Speed control lever (15)	Position in bracket (8)	
		c. Two washers (6 and 13)	Install	
		d. Nut (5)	Install	
		e. Nut (4)	Install on ball joint (3)	
		f. Ball joint (3)	Install on cable (53) and position in bracket (8)	
		g. Lock washer (2)	Install	
		h. Nut (1)	Install	
ADJUSTMENT				
19	Instrument panel, bottom	Cables (53, 54)	Loosen cable nuts, center threaded portion of cable in bracket, and retighten nuts	 TA126961
20	Engine compartment, bracket (44)	Cables (53, 54)	Loosen cable nuts, center threaded portion of cable in bracket, and retighten nuts	

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
21	Instrument panel	a. Direction control lever (24)	a. Move into forward (F) position b. Measure clearance between lever and front end of slot. Clearance must be 0.5-0.7 inch. Adjust if necessary.	
			 FRONT END SLOT TA126962	
			c. Adjust as follows: (1) Remove cotter pin (17) and clevis pin (18) (2) Disconnect clevis (19) (3) Loosen nut (25) (4) Adjust clevis (19) by threading onto or out of cable (54) (5) Tighten nut (25) (6) Connect clevis (19) to lever (24) tab (7) Install clevis pin (18) and cotter pin (17) (8) Measure clearance (step b above)	
			d. Move into reverse (R) position. e. Measure clearance between lever and back end of slot. Clearance must be 0.5-0.7 inch. Adjust as necessary (step c above)	
		b. Speed control lever (15)	a. Move into second (2) speed position. b. Measure clearance between lever and top of slot as indicated. Clearance must be 0.9-1.1 inch. Adjust as necessary	
			 THIRD SPEED POSITION MEASURE CLEARANCE SECOND SPEED POSITION FIRST SPEED POSITION TA126963	

2-38. TRANSMISSION MAINTENANCE (cont)

b. Transmission Linkage Controls (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
21 (cont)				c. Adjust as follows: (1) Remove nut (1) and lock washer (2) (2) Detach ball joint (3) (3) Loosen nut (25) (4) Adjust ball joint (3) by threading onto or out of cable (53) (5) Tighten nut (25) (6) Install ball joint (3) (7) Install lock washer (2) and nut (1) (8) Measure clearance (step b above) d. Move lever into first (1) and third (3) speed positions. Full detent shall be achieved.

2-38. TRANSMISSION MAINTENANCE (cont)

c. *Axle Disconnect Lever.*

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Torque Wrench, zero to 50 pounds foot range
Thread Cutting Die

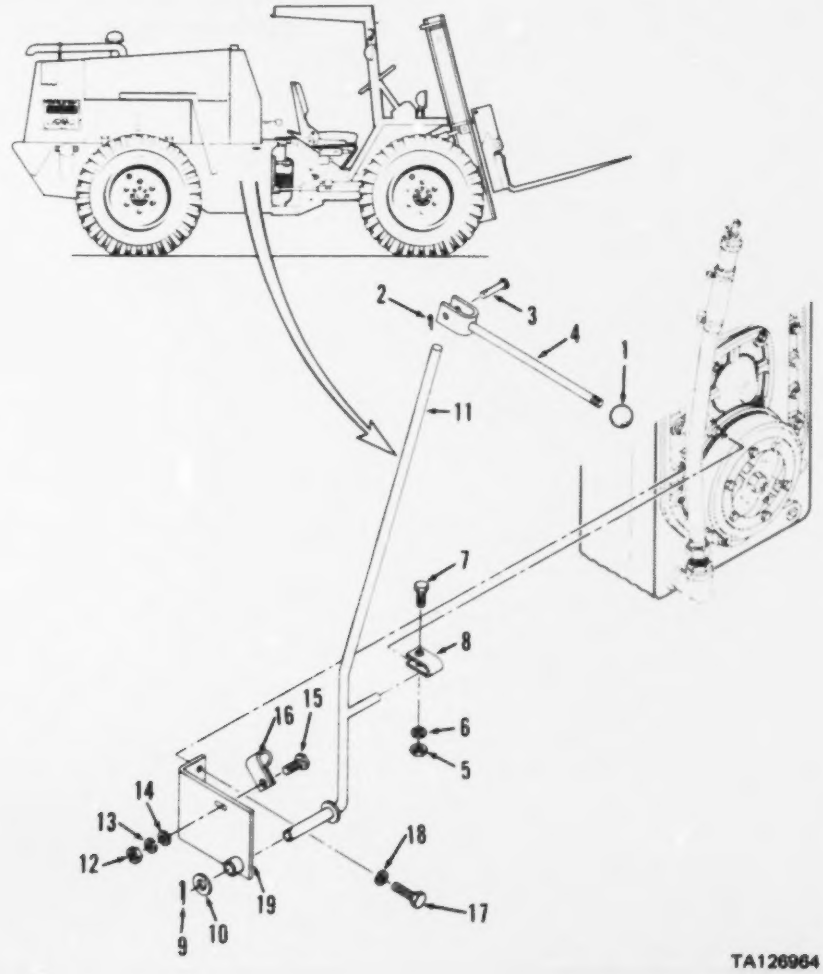
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle turned (articulated) to left, engine off, and parking brake applied.
2-53f	Front cover panel removed.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Cotter pins

KEY

1. Knob
2. Cotter pin
3. Pin
4. Upper lever
5. Nut
6. Lock washer
7. Cap screw
8. Clamp
9. Cotter pin
10. Washer
11. Rod
12. Nut
13. Lock washer
14. Washer
15. Cap screw
16. Clamp
17. Cap screws
18. Lock washers
19. Bracket



2-38. TRANSMISSION MAINTENANCE (cont)

c. Axle Disconnect Lever (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, rear	a. Knob (1)	Remove	
		b. Cotter pin (2)	Remove and discard	
		c. Pin (3)	Remove	
		d. Upper lever (4)	Remove	
2	Transmission	a. Nut (5), lock washer (6), and cap screw (7)	Remove	
		b. Clamp (8)	Remove	
		c. Cotter pin (9)	Remove and discard	
		d. Washer (10)	Remove	
		e. Rod (11)	Remove	
		NOTE Perform steps f through i only if bracket (19) requires replacement.		
		f. Nut (12), lock washer (13), washer (14), and cap screw (15)	Remove	
		g. Clamp (16)	Remove	
		h. Two cap screws (17) and lock washers (18)	Remove	
		i. Bracket (19)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		All parts	Clean	Use cleaning solvent P-D-680; dry thoroughly

2-38. TRANSMISSION MAINTENANCE (cont)

c. *Axle Disconnect Lever (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Upper lever (4) and rod (11)	Inspect	Replace if bent or cracked; repair threads by chasing with proper size die
5		Knob (1)	Inspect	Replace if cracked, chipped or threads damaged
6		Pin (3)	Inspect	Replace if bent or cracked
7		Clamps (8 and 16)	Inspect	Replace if cracked
8		Bracket (19)	Inspect	Replace if bent, cracked, or spacer damaged
INSTALLATION				
9	Transmission	a. Bracket (19)	Position	
		b. Two lock washers (18) and cap screws (17)	Install	Tighten to 37-41 pounds foot torque
		c. Clamp (16)	Position	On dipstick assembly
		d. Cap screw (15)	Position	Secures clamp (16) to bracket (19)
		e. Washer (14), lock washer (13), and nut (12)	Install	
		f. Rod (11)	Position	In bracket (19)
		g. Washer (10)	Position	On rod (11)
		h. Cotter pin (9)	Install	Bend over
		i. Clamp (8)	Position	On rod (11), line up holes in clamp with holes in shift rod
		j. Cap screw (7)	Position	
		k. Lock washer (6) and nut (5)	Install	
10	Operator's compartment, rear	a. Upper lever (4)	Position	On rod (11)
		b. Pin (3)	Install	
		c. Cotter pin (2)	Install	Bend over
		d. Knob (1)	Install	
		e. Front cover panel	Install	Para 2-53f

2-38. TRANSMISSION MAINTENANCE (cont)

d. Dipstick Tube Assembly.

This task covers:
a.- Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

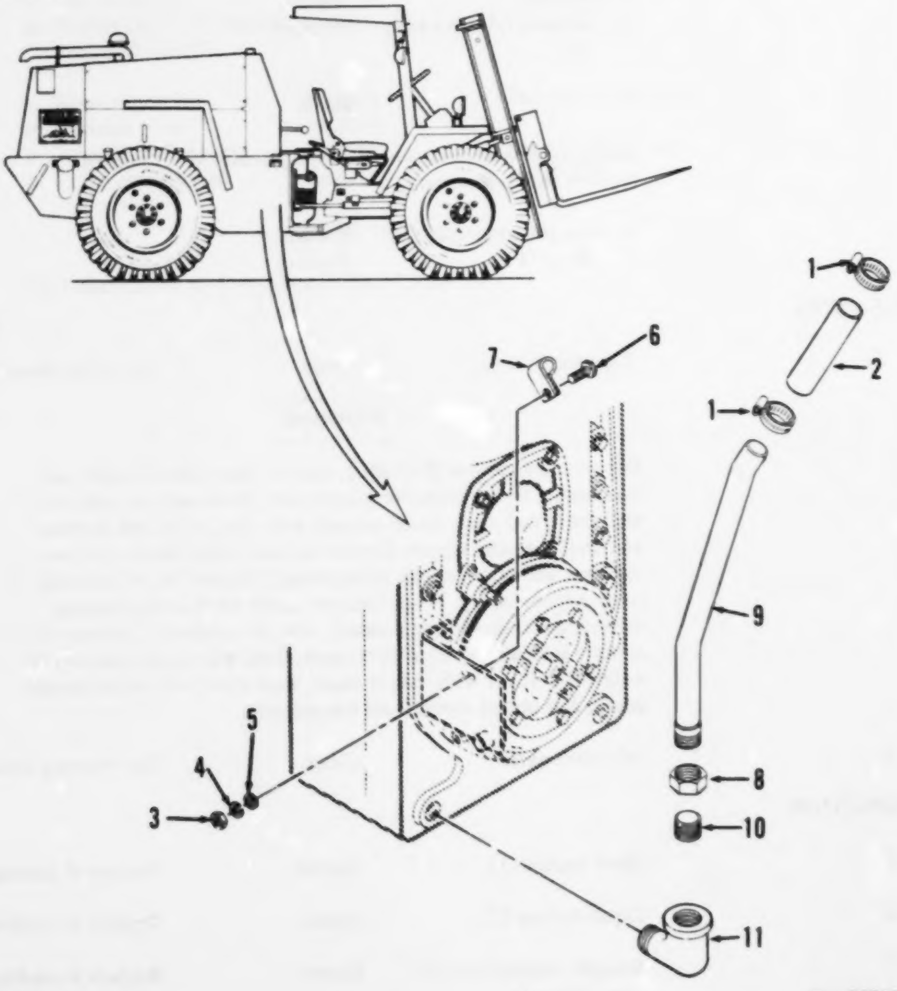
Clean diesel fuel
Cleaning solvent P-D-680
Clean cloths
Replacement dipstick tube assembly

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle turned (articulated) to left, engine off, and parking brake applied.
2-53f	Front cover panel removed.
2-38a(1)	Transmission oil drained.

KEY

1. Hose clamps
2. Dipstick hose
3. Nut
4. Lock washer
5. Flat washer
6. Cap screw
7. Clamp
8. Nut
9. Dipstick tube assembly
10. Straight connector
11. Elbow



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NOTE: AXLE DISCONNECT LEVER NOT SHOWN FOR CLARITY.

2-38. TRANSMISSION MAINTENANCE (cont)

d. Dipstick Tube Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, rear	a. Two hose clamps (1) b. Dipstick hose (2)	Loosen Remove	
2	Transmission	a. Nut (3), lock washer (4), washer (5), and cap screw (6) b. Clamp (7) c. Nut (8) d. Dipstick tube assembly (9)	Remove Remove Loosen Remove	
		NOTE Don't remove straight connector (10) or elbow (11) unless replacement is necessary.		
		e. Straight connector (10) f. Elbow (11)	Remove Remove	
CLEANING				
3		Dipstick hose (2)	Clean	Use clean diesel fuel
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
5		Hose clamps (1)	Inspect	Replace if damaged
6		Dipstick hose (2)	Inspect	Replace if cracked, cut, or torn
7		Straight connector (10) and elbow (11)	Inspect	Replace if cracked, distorted, or threads damaged

2-38. TRANSMISSION MAINTENANCE (cont)

d. Dipstick Tube Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
8	Transmission	a. Elbow (11)	Install	
		b. Straight connector (10)	Install	
		c. Dipstick tube assembly (9)	Position	
		d. Nut (8)	Tighten	
		e. Clamp (7)	Position	Carefully slip over dipstick tube assembly (9)
		f. Cap screw (6)	Position	Secures clamp (7)
		g. Washer (5), lock washer (4), and nut (3)	Install	
9	Operator's compartment, rear	a. Hose clamp (1)	Position	On dipstick hose (2)
		b. Dipstick hose (2)	Position	
		c. Two hose clamps (1)	Tighten	Bottom clamp only
		d. Front cover panel	Install	Para 2-53f

NOTE

Fill transmission with oil (para 2-38a(1), step 2).

2-38. TRANSMISSION MAINTENANCE (cont)

e. *Control Valve.* This task covers inspection of the control valve.

INITIAL SETUP

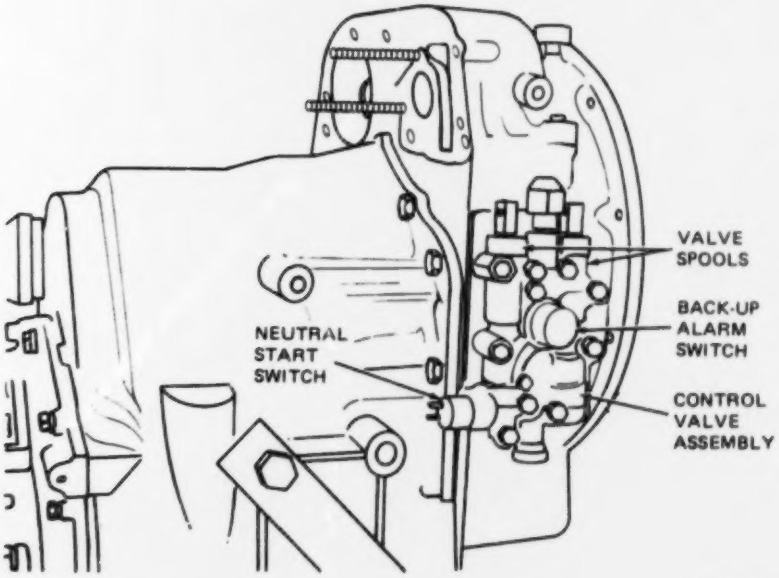
TOOLS
None

MATERIALS/PARTS
None

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off, vehicle parked on level surface and parking brake applied.
2-53c	Left side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Transmission, left side	a. Valve spools	Inspect for oil leakage	Notify direct support maintenance if oil leakage is observed
		b. Back-up alarm switch	Inspect for oil leakage at mounting area	Notify direct support maintenance if oil leakage is observed
		c. Neutral start switch	Inspect for oil leakage at mounting area	Notify direct support maintenance if oil leakage is observed
		d. Control valve	Inspect for oil leakage at mounting area	Notify direct support maintenance if oil leakage is observed



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2-38. TRANSMISSION MAINTENANCE (cont)

f. Transmission Hoses, Lines and Fittings.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

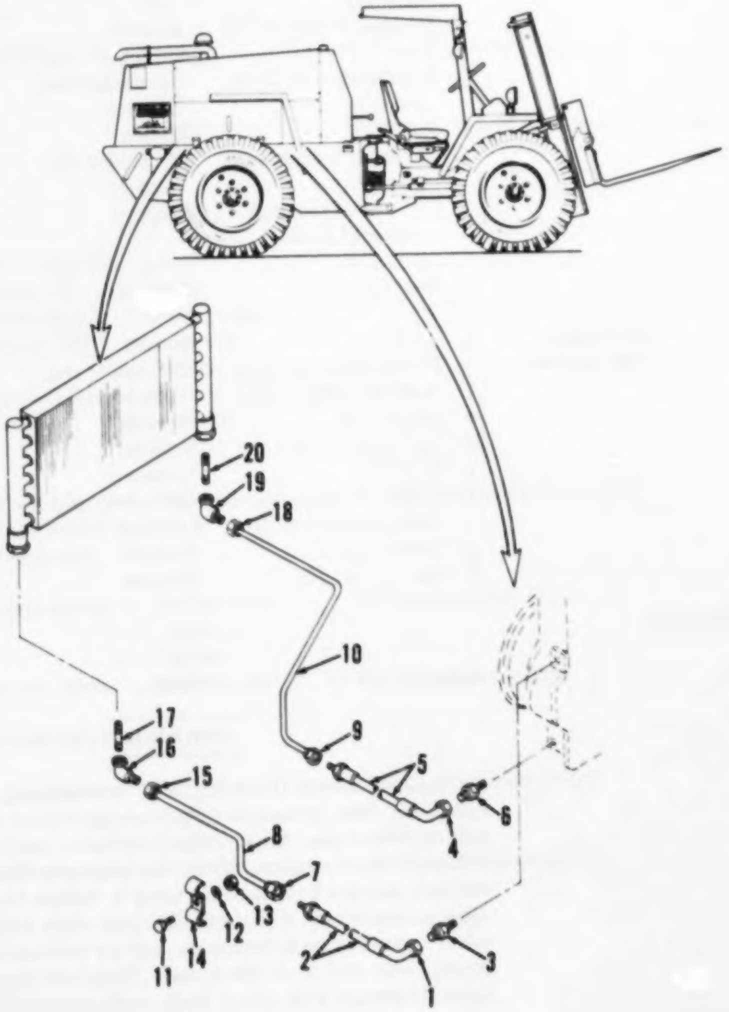
Cleaning solvent P-D-680
Clean diesel fuel
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off and parking brake applied.
2-53c	Right side panel removed.
2-53a	Tow bar lowered and grille opened.

KEY

1. Nut
2. Transmission to cooler hose
3. Straight connector
4. Nut
5. Cooler to transmission hose
6. Straight connector
7. Nut
8. Transmission to cooler tube assembly
9. Nut
10. Cooler to transmission tube assembly
11. Cap screw
12. Lock washer
13. Nut
14. Hose clamp
15. Nut
16. Elbow
17. Pipe nipple
18. Nut
19. Elbow
20. Pipe nipple



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2-38. TRANSMISSION MAINTENANCE (cont)

f. Transmission Hoses, Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment	a. Nut (1)	Loosen	
		b. Transmission to cooler hose (2)	Disconnect and cap	
		c. Straight connector (3)	Remove	Plug transmission hole
		d. Nut (4)	Loosen	
		e. Cooler to transmission hose (5)	Disconnect and cap	
		f. Straight connector (6)	Remove	Plug transmission hole
		g. Nut (7)	Loosen	
		h. Transmission to cooler hose (2)	Disconnect and remove	Plug transmission to cooler tube assembly (8)
		i. Nut (9)	Loosen	
		j. Cooler to transmission hose (5)	Disconnect and remove	Plug cooler to transmission tube assembly (10)
		k. Cap screw (11), lock washer (12), and nut (13)	Remove	
		l. Hose clamp (14)	Remove	
2	Transmission cooler, bottom	a. Nut (15)	Loosen	
		b. Transmission to cooler tube assembly (8)	Disconnect and remove	Plug cooler hole
		c. Elbow (16)	Remove	
		d. Pipe nipple (17)	Remove	
		e. Nut (18)	Loosen	
		f. Cooler to transmission tube assembly (10)	Disconnect and remove	Plug cooler hole
		g. Elbow (19)	Remove	
		h. Pipe nipple (20)	Remove	
CLEANING				
3		Hoses (2 and 5)	Clean	Use clean diesel fuel and dry thoroughly

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-38. TRANSMISSION MAINTENANCE (cont)

f. Transmission Hoses, Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		All other parts	Clean	Use cleaning solvent P-D-680 and dry thoroughly
INSPECTION				
5		Hoses (2 and 5)	Inspect	Replace if cracked, split, or fittings damaged
6		Tube assemblies (8 and 10)	Inspect	Replace if cracked, dented, or fittings damaged
7		All other parts	Inspect	Replace if cracked, damaged or threads worn
INSTALLATION				
8	Transmission cooler, bottom	a. Pipe nipple (17 and 20)	Install	
		b. Elbow (16 and 19)	Install	
		c. Cooler to transmission tube assembly (10)	Position and connect	To elbow (19)
		d. Nut (18)	Tighten	
		e. Transmission to cooler tube assembly (8)	Position and connect	To elbow (16)
		f. Nut (15)	Tighten	
9	Engine compartment	a. Hose clamp (14)	Position	On tube assemblies (8 and 10)
		b. Nut (13), lock washer (12), and cap screw (11)	Install	
		c. Cooler to transmission hose (5)	Position and connect	To tube assembly (10)
		d. Nut (9)	Tighten	
		e. Transmission to cooler hose (2)	Position and	To tube assembly (8)
		f. Straight connector (3 and 6)	Install	
		g. Cooler to transmission hose (5)	Connect	To straight connector (6)
		h. Nut (4)	Tighten	
		i. Transmission to cooler hose (2)	Connect	To straight connector (3)
		j. Nut (1)	Tighten	

2-38. TRANSMISSION MAINTENANCE (cont)

g. Transmission Oil Cooler.

This task covers oil cooler replacement.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Clean hydraulic oil (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53a	Grille removed.
2-30a	Rear flood lights removed.
2-30d	Stop and tail light removed.
2-17c	Radiator coolant reservoir removed.
2-53c	Side panels removed.
2-38f	Transmission to cooler and cooler to transmission tube assemblies disconnected at transmission oil cooler and capped to prevent entry of foreign material. Elbows and pipe nipples removed from transmission oil cooler.
2-32c	Back-up alarm removed.

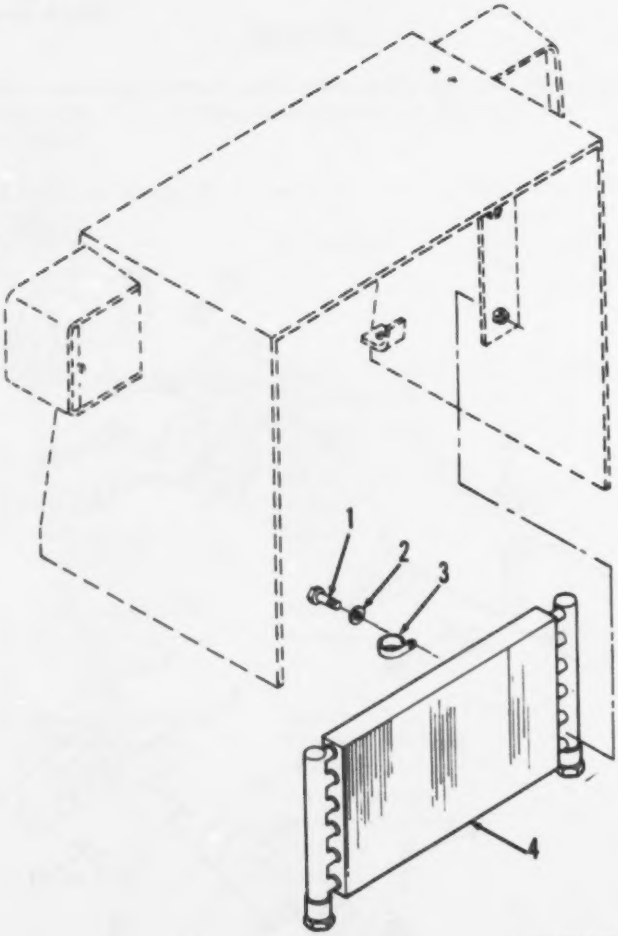
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission oil cooler, sides	a. Four cap screws (1) and lock washers (2)	Remove	
		b. Four clamps (3)	Remove	
		c. Transmission oil cooler (4)	Remove	
INSTALLATION				
2	Radiator shroud	a. Transmission oil cooler (4)	Position	
		b. Four clamps (3)	Position	
		c. Four lock washers (2) and cap screws (1)	Install and tighten	

2-38. TRANSMISSION MAINTENANCE (cont)

g. *Transmission Oil Cooler (cont).*

KEY

1. Cap screws
2. Lock washers
3. Clamps
4. Transmission oil cooler



TA126967

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE

a. Front Drive Shaft Assembly and Support Bearing.

This task covers:
- a. Servicing
- b. Removal
- c. Disassembly
- d. Cleaning
- e. Inspection
- f. Reassembly/Repair
- g. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680

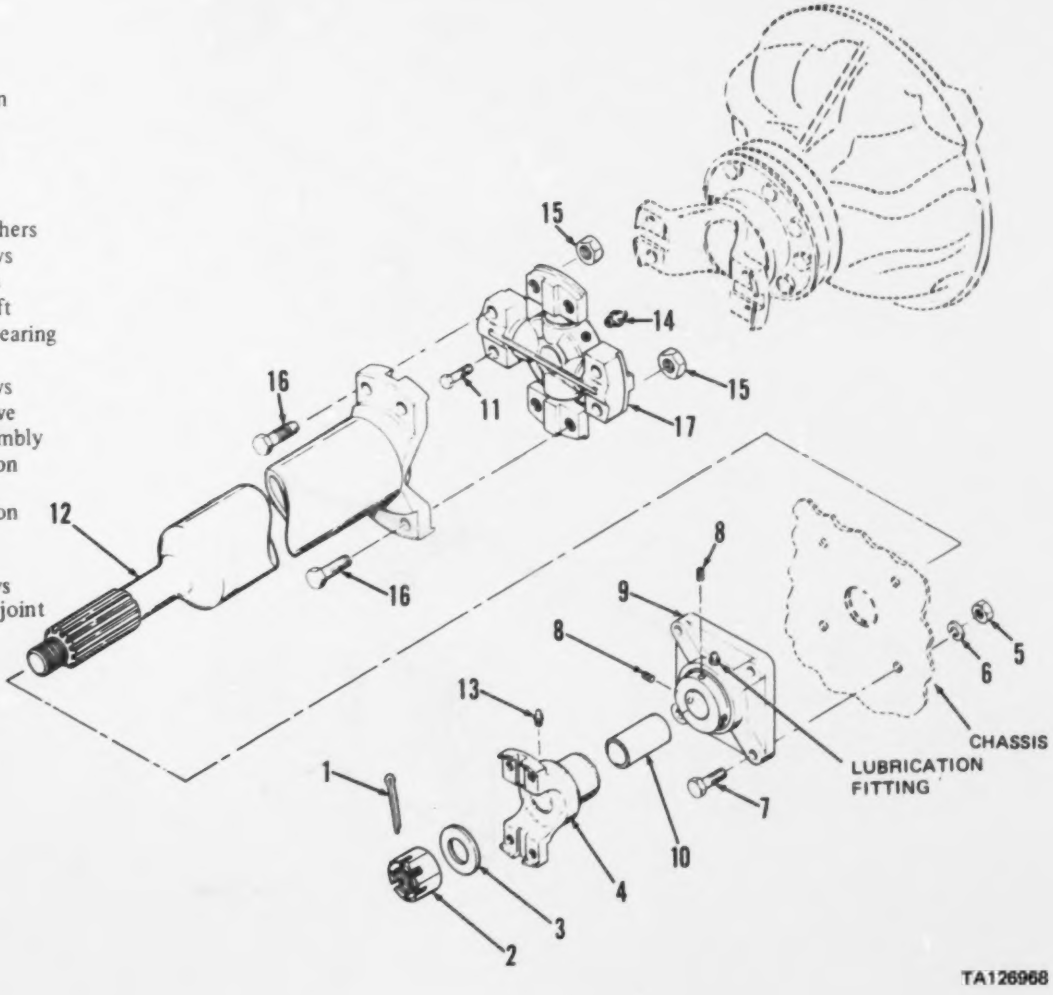
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, parking brake applied, and engine off.
2-53i	Chassis guard removed.
	Vehicle turned either left or right.

KEY

1. Cotter pin
2. Nut
3. Washer
4. Yoke
5. Nuts
6. Lock washers
7. Cap screws
8. Setscrews
9. Drive shaft support bearing
10. Collar
11. Cap screws
12. Front drive shaft assembly
13. Lubrication fitting
14. Lubrication fitting
15. Nuts
16. Cap screws
17. Universal joint



TA126968

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

a. Front Drive Shaft Assembly and Support Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
SERVICING				
1	Drive shaft support bearing (9)	Lubrication fitting	a. Clean	Use clean cloth and remove dirt and grease
			b. Lubricate	Refer to current lubrication order; lubricate until grease oozes out of bearing
		CAUTION Don't use a high pressure grease gun to apply lubricant to lubrication fitting (14). Use of a high pressure grease gun will cause seals to rupture.		
2	Universal joint (17) and yoke (4)	Lubrication fitting (14 and 13)	a. Clean	Use clean cloth and remove dirt and grease
			b. Lubricate	Refer to current lubrication order; lubricate until grease oozes out of fitting
REMOVAL				
3	Drive shaft support bearing	a. Center drive shaft	Disconnect from front drive shaft yoke (4)	Para 2-39b, step 2
		b. Cotter pin (1)	Remove	
		c. Nut (2) and washer (3)	Remove	
		d. Yoke (4)	Remove	Use puller
		e. Four nuts (5), lock washers (6), and cap screws (7)	Remove	
		f. Two setscrews (8)	Remove	
		g. Drive shaft support bearing (9)	Remove	
4	Front axle differential companion yoke	a. Four cap screws (11)	Remove	
		b. Front drive shaft assembly (12)	Remove by moving towards rear, dropping it downward and pulling forward	
		c. Collar (10)	Remove	
DISASSEMBLY				
5	Yoke (4)	Lubrication fitting (13)	Remove	
6	Front drive shaft assembly	a. Lubrication fitting (14)	Remove	
		b. Four nuts (15) and cap screws (16)	Remove	
		c. Universal joint (17)	Remove	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

a. Front Drive Shaft Assembly and Support Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
7		Drive shaft support bearing (9) and universal joint (17)	Clean	Use clean cloth moistened with cleaning solvent P-D-680
8		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
9		Drive shaft support bearing (9), universal joint (17)	Inspect	Replace if cracked, threads damaged, or otherwise damaged
10		Drive shaft (12)	Inspect	Replace if cracked, bent, or twisted
11		All other parts	Inspect	Replace if cracked, bent, or threads damaged
REASSEMBLY/REPAIR				
12	Front drive shaft assembly	a. Universal joint (17) b. Four cap screws (16) and nuts (15) c. Lubrication fitting (14)	Position Install Install	
13	Yoke (4)	Lubrication fitting (13)	Install	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

a. Front Drive Shaft Assembly and Support Bearing (cont).

INSTALLATION/REPLACEMENT

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
14	Front axle differential companion yoke	a. Mounting surfaces	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		b. Front drive shaft assembly (12)	Position and align universal joint mounting holes with mounting holes on companion yoke	
		c. Four cap screws (11)	Install	Tighten to 40-50 pounds foot torque
15	Rear chassis, front	a. Drive shaft support bearing (9) and collar (10)	Position	
		b. Two setscrews (8)	Install	
		c. Four cap screws (7), lock washers (6), and nuts (5)	Install	
		d. Yoke (4)	Position on front drive shaft assembly, splined end	Be sure yoke is lined up with yoke on front end of drive shaft
		e. Washer (3)	Position	
		f. Nut (2)	Install	Tighten to 300-400 pounds foot torque
		g. Cotter pin (1)	Install	
		h. Center drive shaft	Connect to front drive shaft assembly yoke (4)	Para 2-39b, step 10
16	Front drive shaft assembly, support bearing and yoke	Lubrication fittings	Service	Refer to step 1 above

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

b. Center Drive Shaft Assembly.

This task covers:

- a. Servicing
- b. Removal
- c. Disassembly
- d. Cleaning
- e. Inspection
- f. Reassembly/Repair
- g. Installation/Replacement

INITIAL SETUP

TOOLS

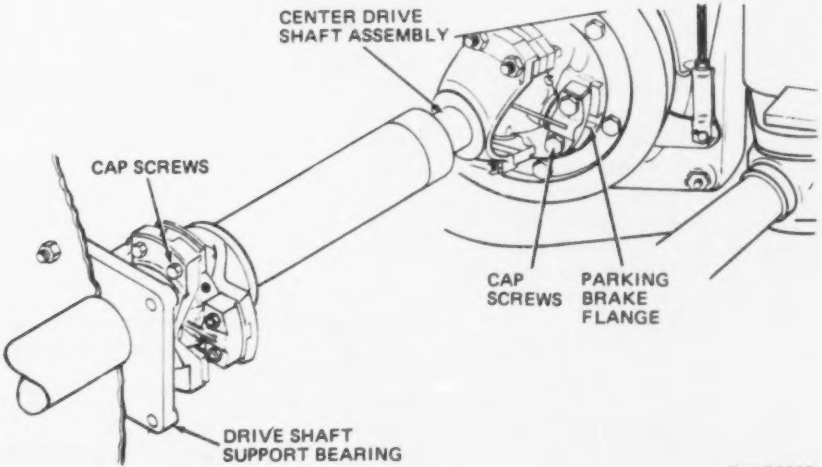
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Soft honing stone
Crocus cloth
Seal shaft kit

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, parking brake applied, and engine off.


CENTER DRIVE SHAFT ASSEMBLY
CAP SCREWS
CAP SCREWS
PARKING BRAKE FLANGE
DRIVE SHAFT SUPPORT BEARING

TA126969

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

b. Center Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
SERVICING				
1	Universal joints (3) and slip yoke (10)	Three lubrication fittings (4 and 5)	a. Clean	Use clean cloth and remove dirt and grease
		CAUTION Don't use a high pressure grease gun to apply lubricant to grease fittings (4). Use of a high pressure grease gun will cause seals to rupture.		
			b. Lubricate	Refer to current lubrication order; lubricate until grease oozes out of fitting
REMOVAL				
2	Transmission parking brake flange	Four cap screws	Remove	
3	Drive shaft support bearing	a. Four cap screws b. Center drive shaft assembly	Remove Push two sections of center drive shaft together, then remove	
DISASSEMBLY				
4	Center drive shaft assembly	a. Eight nuts (1) and cap screws (2)	Remove	
		b. Two universal joints (3)	Remove	
		c. Two lubrication fittings (4)	Remove	
		d. Lubrication fitting (5)	Remove	
		e. Cap (6)	Loosen and slide back on splined yoke (9)	
		f. Washer (7 and 8)	Slide back on splined yoke (9)	
		g. Splined yoke (9)	Remove; then remove and discard washers (7 and 8) and cap (6)	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

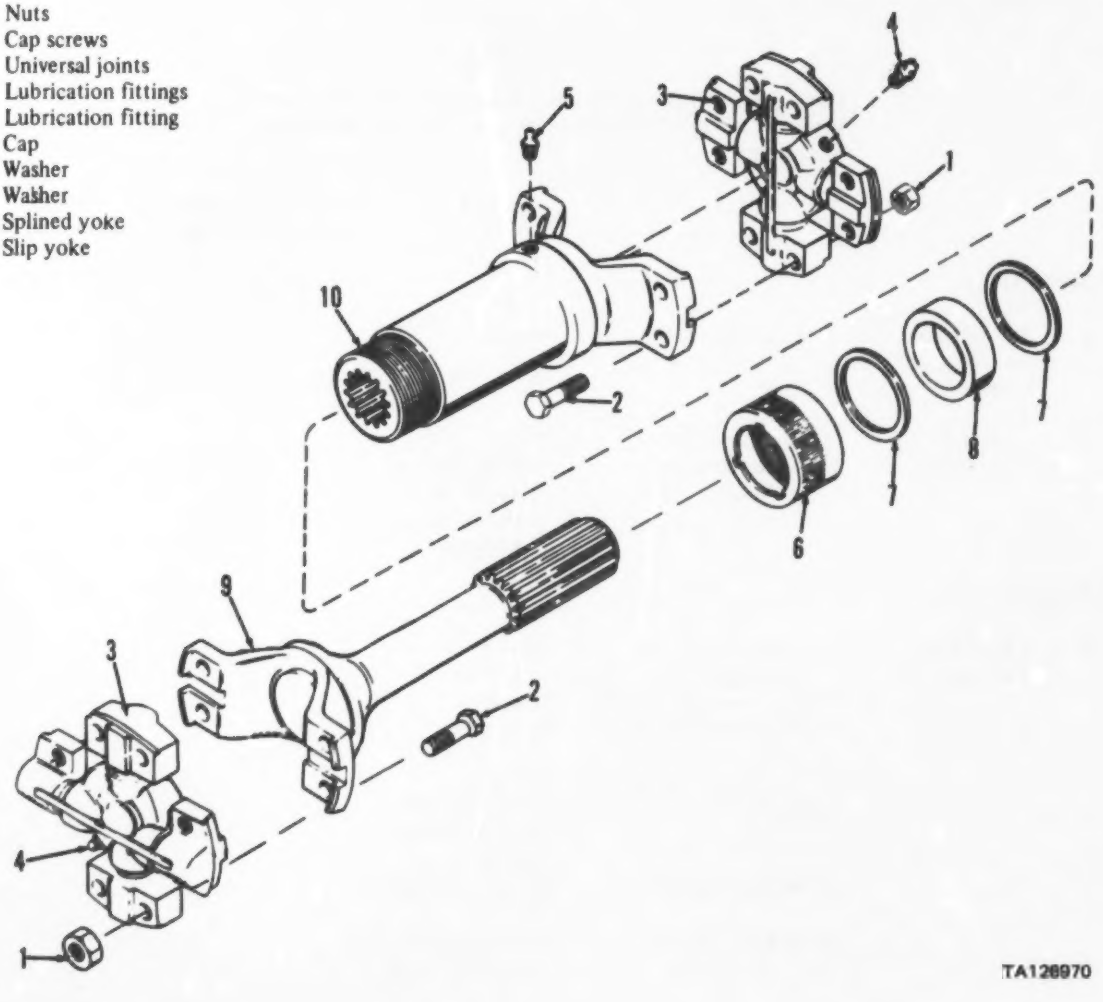
b. Center Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

DISASSEMBLY (cont)

KEY

1. Nuts
2. Cap screws
3. Universal joints
4. Lubrication fittings
5. Lubrication fitting
6. Cap
7. Washer
8. Washer
9. Splined yoke
10. Slip yoke



TA126970

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

b. Center Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
5		Universal joint (3)	Clean	Use clean cloth moistened with cleaning solvent P-D-680
6		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
7		Universal joint (3), splined yoke (9), and slip yoke (10)	Inspect	Replace if cracked, threads damaged, splines twisted, teeth broken, bent, or otherwise damaged. Remove burrs with soft honing stone or crocus cloth
8		All other parts	Inspect	Replace if cracked or threads damaged
REASSEMBLY/REPAIR				
9	Center drive shaft assembly	a. Cap (6), washers (7 and 8)	Position on splined yoke (9)	
		b. Splined yoke (9)	Insert into slip yoke (10)	
		c. Washers (7 and 8) and cap (6)	Position against slip yoke (10); tighten cap (6)	
		d. Lubrication fittings (4 and 5)	Install	
		e. Two universal joints (3)	Position Install	
		f. Eight cap screws (2) and nuts (3)	Install	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

b. Center Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
10	Drive shaft support bearing	a. Mounting surfaces	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		b. Slip yoke (10)	Position and align universal joint mounting holes with front drive shaft yoke mounting holes	
		c. Four cap screws		Tighten to 40-50 pounds foot torque
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
11	Transmission parking brake flange	a. Mounting surfaces	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		b. Splined yoke (9)	Position; push/pull two sections of drive shaft then align universal joint mounting holes with brake flange mounting holes	
		c. Four cap screws	Install	Tighten to 40-50 pounds foot torque
12	Center drive shaft assembly	Lubrication fittings	Service	Refer to step 1 above

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

c. Rear Drive Shaft Assembly.

This task covers:
- a. Servicing
- b. Removal
- c. Disassembly
- d. Cleaning
- e. Inspection
- f. Reassembly/Repair
- g. Installation/Replacement

INITIAL SETUP

TOOLS

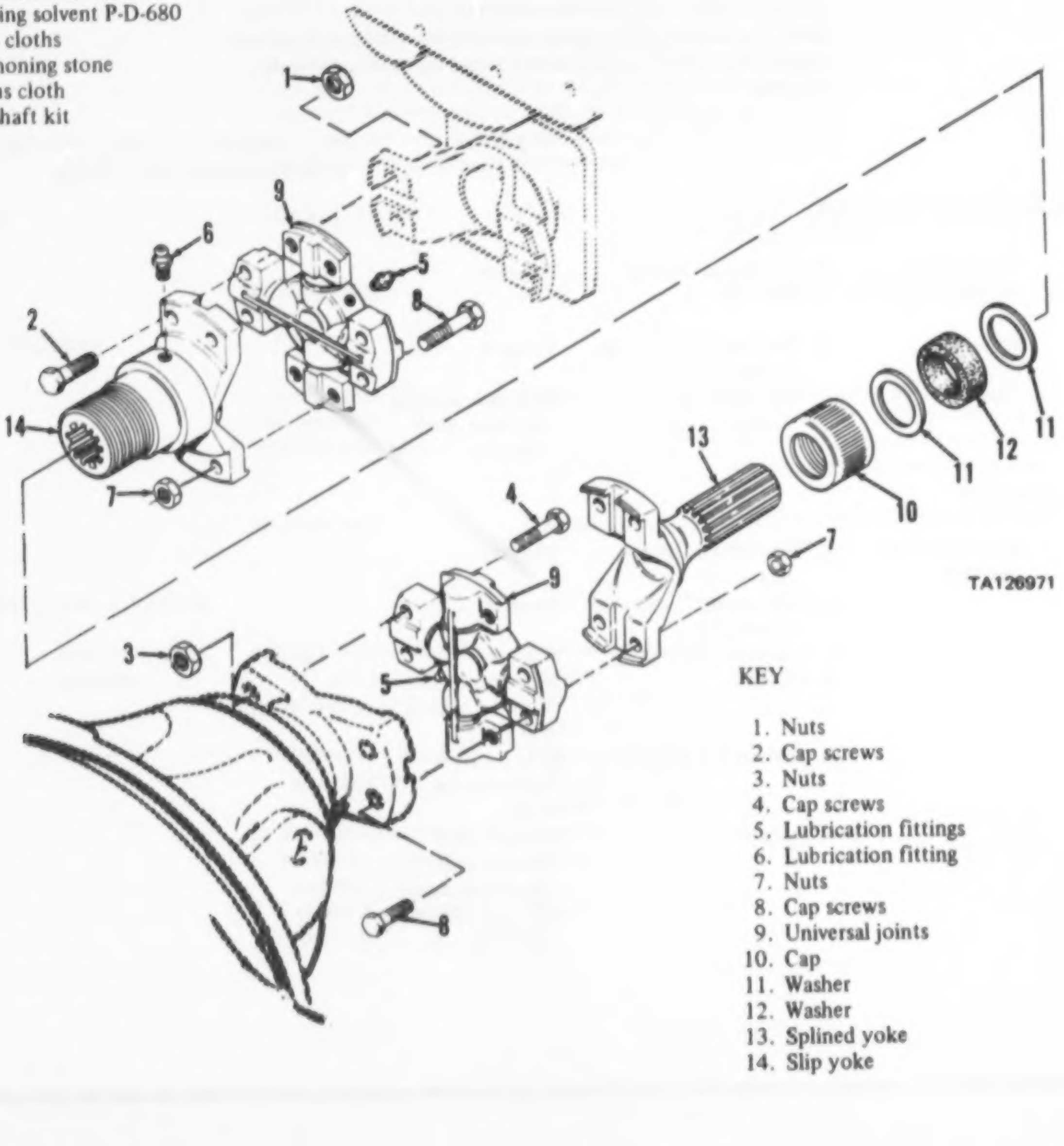
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, parking brake applied, and engine off.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Soft honing stone
Crocus cloth
Seal shaft kit



KEY

1. Nuts
2. Cap screws
3. Nuts
4. Cap screws
5. Lubrication fittings
6. Lubrication fitting
7. Nuts
8. Cap screws
9. Universal joints
10. Cap
11. Washer
12. Washer
13. Splined yoke
14. Slip yoke

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

c. Rear Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
SERVICING				
1	Universal joints (9) and slip yoke (14)	Lubrication fittings (5 and 6)	a. Clean	Use clean cloth and remove dirt and grease
		CAUTION Don't use a high pressure grease gun to apply lubricant to grease fittings (5). Use of a high pressure grease gun will cause seals to rupture.		
			b. Lubricate	Refer to current lubrication order; lubricate until grease oozes out of fitting
REMOVAL				
2	Transmission output flange	Four nuts (1) and cap screws (2)	Remove	
3	Rear axle differential companion yoke	a. Four nuts (3) and cap screws (4)	Remove	
		b. Rear drive shaft assembly	Push two sections together, then remove	
DISASSEMBLY				
4	Rear drive shaft assembly	a. Lubrication fittings (5 and 6)	Remove	
		b. Eight nuts (7) and cap screws (8)	Remove	
		c. Universal joints (9)	Remove	
		d. Cap (10)	Loosen and slide back on splined yoke (13)	
		e. Washers (11 and 12)	Slide back on splined yoke (13)	
		f. Splined yoke (13)	Remove; then remove and discard washers (11 and 12) and cap (10)	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

c. *Rear Drive Shaft Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		Universal joint (9)	Clean	Use clean cloth moistened with cleaning solvent P-D-680
6		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
7		Universal joint (9), splined yoke (13), and slip yoke (14)	Inspect	Replace if cracked, threads damaged, splines twisted, teeth broken, bent, or otherwise damaged. Remove burrs with soft honing stone or crocus cloth
8		All other parts	Inspect	Replace if cracked, bent, or threads damaged
REASSEMBLY/REPAIR				
9	Rear drive shaft assembly	a. Cap (10), and washers (11 and 12)	Position on splined yoke (13)	
		b. Splined yoke (13)	Insert into slip yoke (14)	
		c. Washers (11 and 12), and cap (10)	Position against slip yoke (14); tighten cap (10)	
		d. Two universal joints (9)	Position	
		e. Eight cap screws (8) and nuts (7)	Install	
		f. Lubrication fittings (5 and 6)	Install	

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

c. Rear Drive Shaft Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
10	Rear axle differential companion yoke	a. Mounting surface	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		b. Rear drive shaft assembly, slip yoke (14) end	Position and align universal joint mounting holes with companion yoke mounting holes	
		c. Four cap screws (4) and nuts (3)	Install	Tighten to 40-50 pounds foot torque
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
11	Transmission output flange	a. Mounting surface	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		b. Rear drive shaft assembly, splined yoke (13)	Position and align universal joint mounting holes with output flange mounting holes	
		c. Four cap screws (2) and nuts (1)	Install	Tighten to 40-50 pounds foot torque
12	Rear drive shaft assembly	Lubrication fittings	Service	Refer to step 1 above

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

d. Front and Rear Axle Assemblies. This task covers inspection and servicing of the front and rear axle assemblies including the associated differential carrier assembly.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

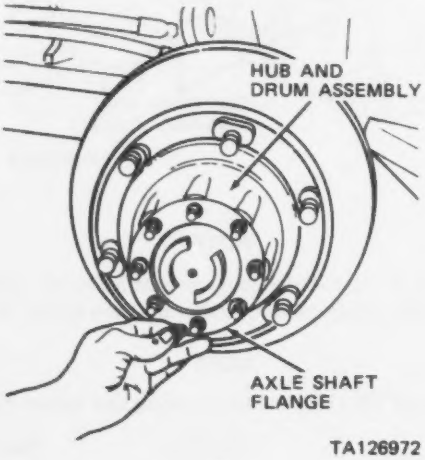
EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off and parking brake applied.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Gear lubricant (refer to current lubrication order)

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
		NOTE If lubrication leaks are observed, notify direct support maintenance.		
1	Wheels	Axle shaft flange	Inspect	Check for lubricant leaks at flange and hub and drum assembly
2	Axles	Differential carrier assembly	Inspect	Check for lubricant leaks at differential carrier assembly and axle housing

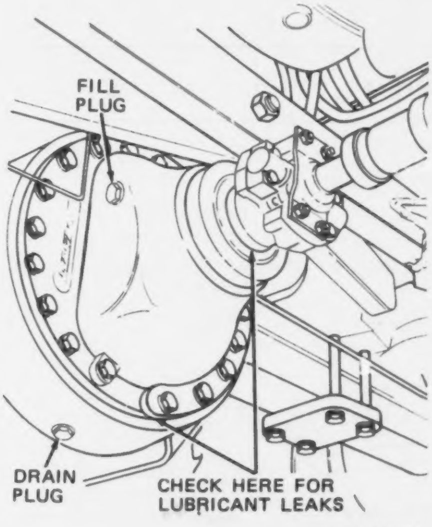


TA126972

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

d. Front and Rear Axle Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
3	Differential carrier assembly	a. Pinion shaft	Inspect	Check for lubricant leaks
		b. Drain and fill plugs	Inspect	Check for lubricant leaks; tighten drain and/or fill plug if leaks observed



TA126973

SERVICING

NOTE

Drive vehicle for 10 minutes to warm axle lubricant, park vehicle on level surface, apply parking brake, and turn engine off.

NOTE

Clean drain and fill plugs and surrounding area before removing.

STEP	LOCATION	ITEM	ACTION	REMARKS
4	Axle housing	Drain plug	Remove	Place 5 gallon container under drain plug to drain lubricant into
5	Differential carrier assembly housing	Fill plug	Remove	
6	Axle housing	Drain plug	Install	
7	Differential carrier assembly housing	a. Fill plug opening	Fill	With axle lubricant (refer to current lubrication order) to fill plug opening
		b. Fill plug		

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

e. Axle Breathers.

This procedure covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

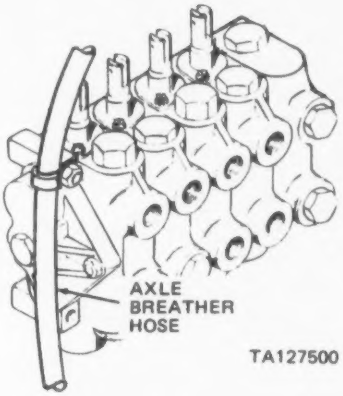
Paragraph	Condition Description
	Engine off and parking brake applied.
2-53h	Noise baffle mat rod removed and mat positioned over instrument panel.

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

e. Axle Breathers (cont).

(1) Front Axle Breather.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Hydraulic control valve, right side	Axle breather	Remove	Unscrew from hose fitting



CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

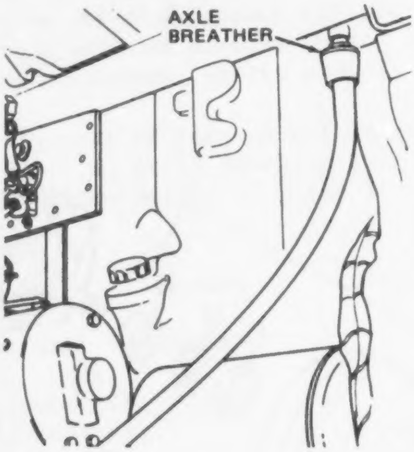
STEP	LOCATION	ITEM	ACTION	REMARKS
2		Axle breather	Clean	Immerse in cleaning solvent P-D-680
INSPECTION				
3		Axle breather	Inspect	Replace if dented or clogged
4		Axle breather hose	Inspect	Replace if cracked or deteriorated
INSTALLATION				
5	Hydraulic control valve, right side	Axle breather	Install	Screw into hose fitting

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

e. Axle Breathers (cont).

(2) Rear Axle Breather.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Left side of vehicle	Left side panel	Remove	Para 2-53c
2	Engine compartment	Axle breather	Remove	Unscrew from hose fitting



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CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

3		Axle breather	Clean	Immerse in cleaning solvent P-D-680
INSPECTION				
4		Axle breather	Inspect	Replace if dented or clogged
5		Axle breather hose	Inspect	Replace if cracked or deteriorated
INSTALLATION				
6	Engine compartment	a. Axle breather b. Left side panel	Install Install	Screw into hose fitting Para 2-53c

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation and adjustment

INITIAL SETUP

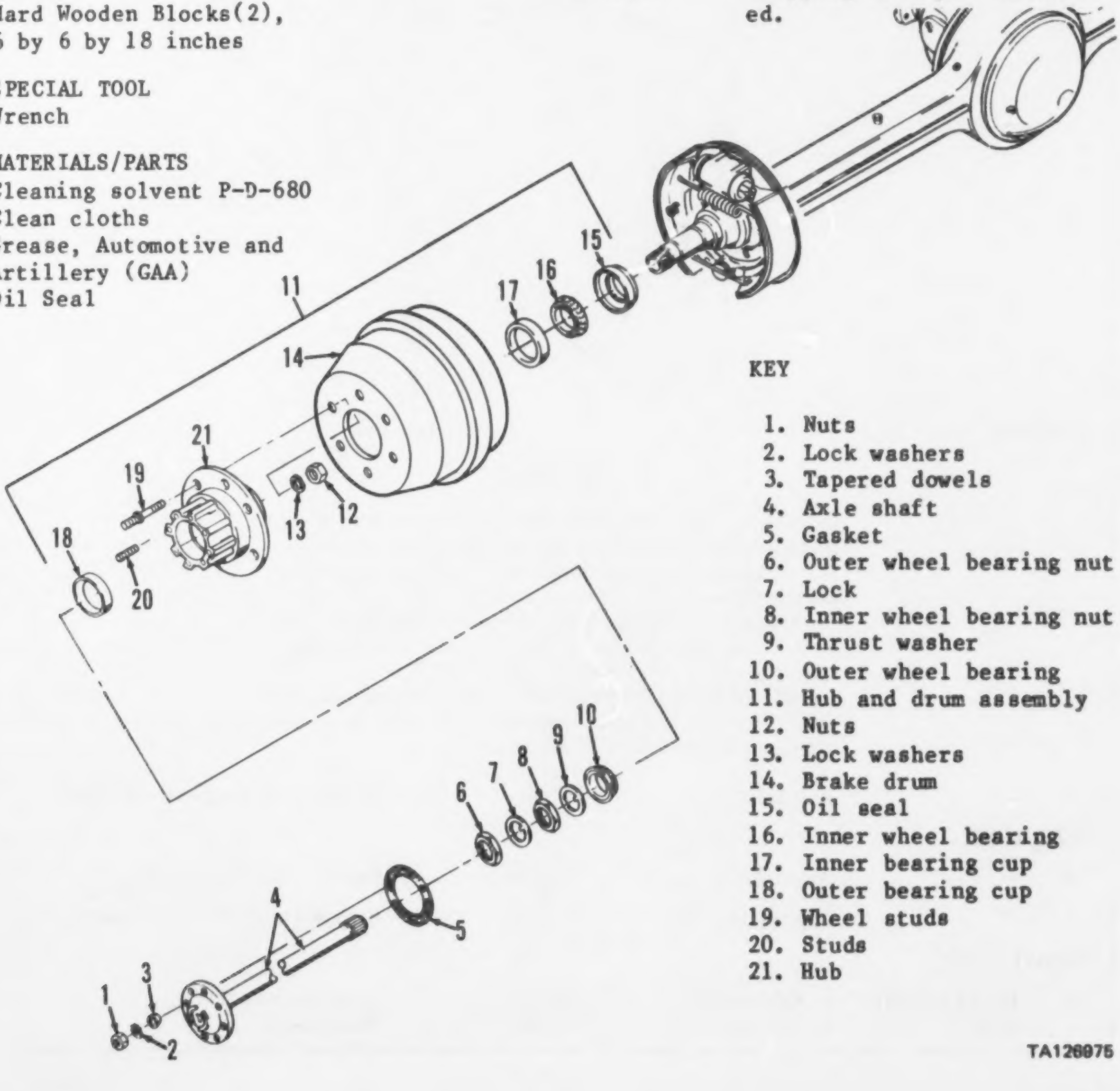
TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Arbor Press, 1/4 ton capacity
Sleeve
Hard Wooden Blocks(2), 6 by 6 by 18 inches

SPECIAL TOOL
Wrench

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Grease, Automotive and Artillery (GAA)
Oil Seal

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, and wheels blocked.
2-4b(1)	Shipping lock pin installed.



KEY

1. Nuts
2. Lock washers
3. Tapered dowels
4. Axle shaft
5. Gasket
6. Outer wheel bearing nut
7. Lock
8. Inner wheel bearing nut
9. Thrust washer
10. Outer wheel bearing
11. Hub and drum assembly
12. Nuts
13. Lock washers
14. Brake drum
15. Oil seal
16. Inner wheel bearing
17. Inner bearing cup
18. Outer bearing cup
19. Wheel studs
20. Studs
21. Hub

TA126975

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings (cont).

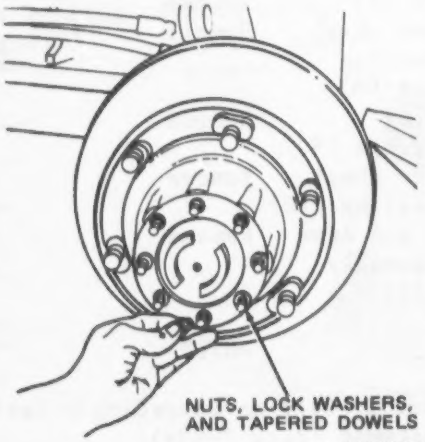
REMOVAL

WARNING

Before raising vehicle from ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jacks or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Tire and wheel assembly must be removed before removing axle shaft and hub and drum assembly to avoid damaging axle oil seal. Damage to seal can result in contamination of brake linings and brake failure.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Front or rear axle	a. Tire and wheel	Remove	Para 2-47
		b. Eight nuts (1), lock washers (2), and tapered dowels (3)	Remove	



2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

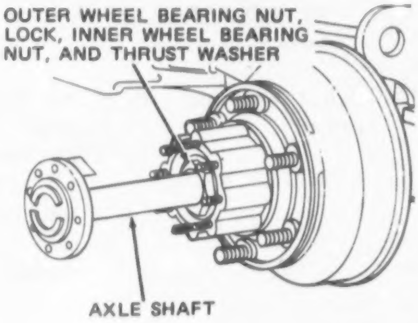
f. Front and Rear Axle Shafts and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
1 (cont)				

NOTE

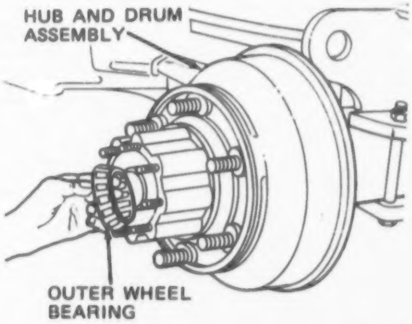
Left and right axle shafts are different lengths; mark axle shafts before removing.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Axle shaft (4)	Remove	If necessary, use hammer to loosen
		d. Gasket (5)	Remove and discard	
		e. Outer wheel bearing nut (6)	Bend tab of lock (7) back then remove nut	


OUTER WHEEL BEARING NUT, LOCK, INNER WHEEL BEARING NUT, AND THRUST WASHER
AXLE SHAFT

TA126977

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Lock (7)	Remove	
		g. Inner wheel bearing nut (8)	Remove	
		h. Thrust washer (9)	Remove	
		i. Outer wheel bearing (10)	Remove	
		j. Hub and drum assembly (11)	Remove	


HUB AND DRUM ASSEMBLY
OUTER WHEEL BEARING

TA126978

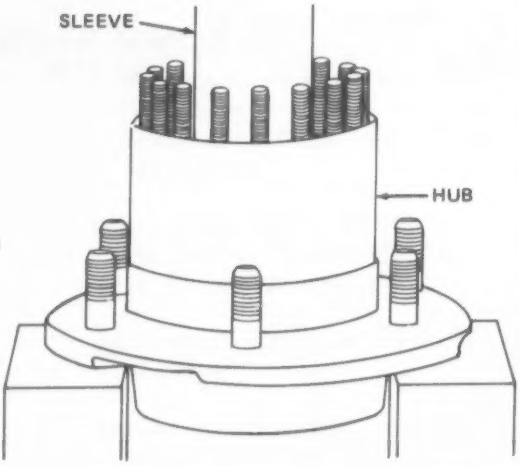
NOTE

If hub and drum assembly (11) is exceedingly hard to remove, back off brake shoe adjustment (para 2-43a).

STEP	LOCATION	ITEM	ACTION	REMARKS
		k. Oil seal (15)	Remove and discard	

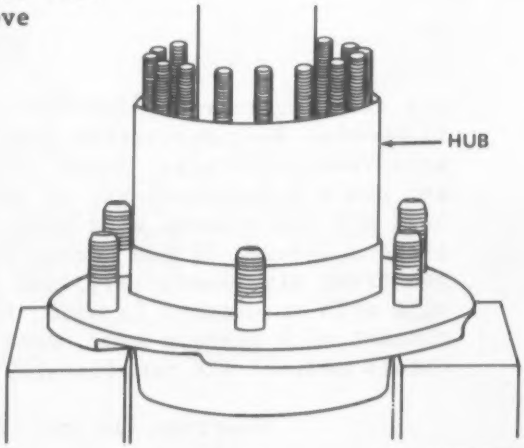
2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY OF HUB AND DRUM ASSEMBLY				
2	Hub and drum assembly	a. Six nuts (12) and lock washers (13)	Remove	 TA126979
		b. Brake drum (14)	Remove	
3	Hub	a. Hub (21)	Place on press	
		b. Inner wheel bearing (16)	Remove	

NOTE

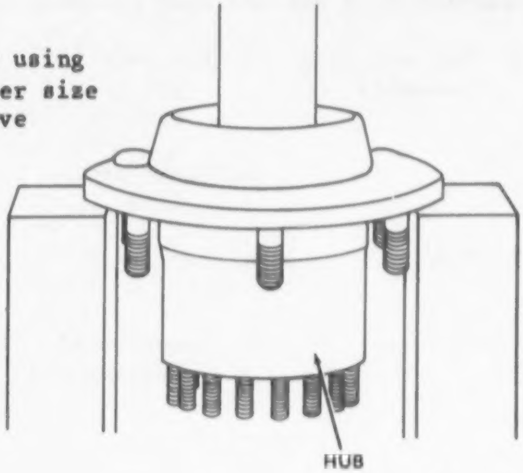
Don't perform following steps unless bearing cups (17 or 18), or hub (21) requires replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Inner bearing cup (17)	Remove using proper size sleeve	 TA126980

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY OF HUB AND DRUM ASSEMBLY (cont)				
3 (cont)		d. Outer bearing cup (18)	Remove using proper size sleeve	



TA126981

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Six wheel studs (19)	Remove by tapping out	
		f. Eight studs (20)	Remove	Only if replacement required
CLEANING				

WARNING

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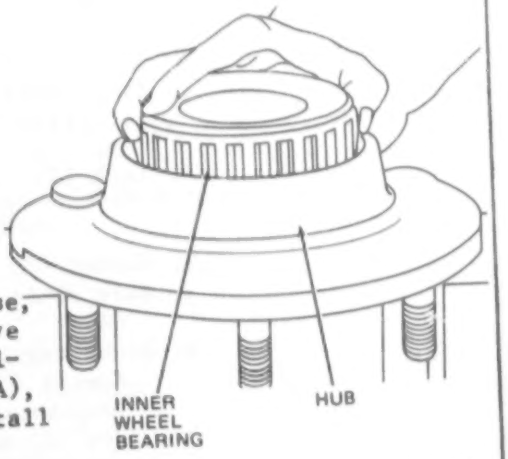
STEP	LOCATION	ITEM	ACTION	REMARKS
4		Bearings (10 and 16)	Clean	Use cleaning solvent P-D-680; air dry. Don't spin bearings with compressed air
5		All other parts	Clean	Use cleaning solvent P-D-680

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings (cont).

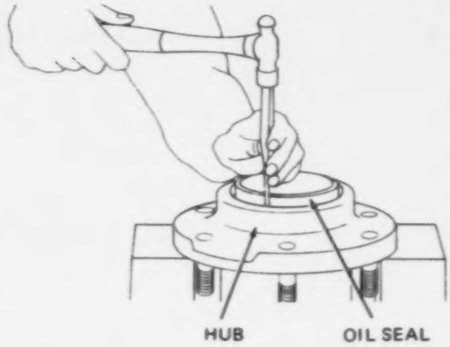
STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
6		Bearings (10 and 16)	Inspect	Replace if worn, chipped, or nicked. If bearing is to be replaced, replace mating bearing cup (17 or 18). Dip bearing in light oil after inspection
7		Axle shaft (4)	Inspect	Replace if bent, twisted, splines worn or damaged, or flange distorted
8		Brake drum (14)	Inspect	Replace if worn, scored, or cracked
9		Hub (21)	Inspect	Replace if cracked; be sure all grease and dirt is removed inside hub
10		All other parts	Inspect	Replace if damaged, bent, or distorted
REASSEMBLY OF HUB AND DRUM ASSEMBLY				
11		a. Eight studs (20)	Install if removed	
		b. Six wheel studs (19)	Install if removed	
		c. Outer bearing cup (18)	Install if removed	
		d. Inner bearing cup (17)	Install if removed	
		e. Inner wheel bearing (16)	Apply grease, automotive and artillery (GAA), then install	
		f. Brake drum (14)	Position	
		g. Six lock washers (13) and nuts (12)	Install	



TA126982

2-39. AXLES AND DRIVE SHAFT ASSEMBLIES MAINTENANCE (cont)

f. Front and Rear Axle Shafts and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION AND ADJUSTMENT				
12	Front or rear axle	a. Oil seal (15)	Install; use hammer and punch as shown	 TA126983
		b. Hub and drum assembly (11)	Install	
		c. Outer wheel bearing (10)	Apply grease, automotive and artillery (GAA), then install	
		d. Thrust washer (9)	Install	
		e. Inner wheel bearing nut (8)	Install; tighten to 50 pounds foot torque. Turn hub several revolutions to right then to left. Tighten nut again and back-off 1/6 to 1/4 turn	
		f. Lock (7)	Install	
		g. Outer wheel bearing nut (6)	Install; tighten to 250-400 pounds foot torque	
		h. Lock (7)	Bend tab over flat of nut (6)	
		i. Gasket (5)	Install	
		j. Axle shaft (4)	Install	
		k. Eight tapered dowels (3), lock washers (2) and nuts (1)	Install	
		l. Tire and wheel	Install	Para 2-47

NOTE

Remove remaining axle shafts and bearings in the same manner as above.

Section VII. BRAKE SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the parking brake and service brake systems. It gives you instructions on how to troubleshoot problems, and repair or replace the components that are within the scope of organizational maintenance.

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Brake System Troubleshooting 2-41
Parking Brake Maintenance 2-42
  Parking Brake Linkage 2-42a
  Parking Brake Assembly 2-42b

Para
Service Brake Maintenance 2-43
  Service Brake Assembly 2-43a
  Brake Hoses, Lines and Fittings 2-43b
  Hydraulic Brake Valve 2-43c
  Declutch Valve 2-43d
  Brake Pedal and Declutch Pedal 2-43e

2-40. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
BRAKE SYSTEM		
Parking brake does not apply (will not hold)	2-41/1	2-259
Uneven or erratic service brakes	2-41/2	2-261
Service brakes spongy	2-41/3	2-262
Service brakes grab	2-41/4	2-263
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Service brakes groan at end of stop	2-41/9	2-269
Scraping noise from service brakes when applied	2-41/10	2-269
Stop light inoperative	2-41/11	2-270
Declutch pedal does not neutralize transmission	2-41/12	2-270

2-41. BRAKE SYSTEM TROUBLESHOOTING

MALFUNCTION
  TEST OR INSPECTION
    CORRECTIVE ACTION

1. PARKING BRAKE DOES NOT APPLY (WILL NOT HOLD)

Step 1. Release parking brake lever and turn knob on top of lever clockwise to adjust cable.
Pull parking brake lever up while observing actuating lever.
Actuating lever should move.

a. If actuating lever moves, proceed to step 3.

b. If actuating lever does not move, proceed to step 2.

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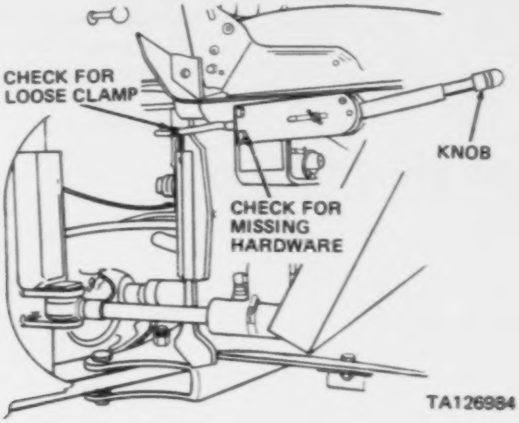
2-40. TROUBLESHOOTING SYMPTOM INDEX

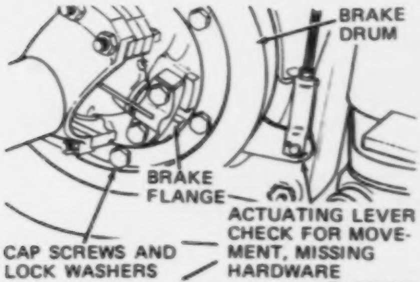
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. PARKING BRAKE DOES NOT APPLY (WILL NOT HOLD) (cont)

Step 1. (cont)


CHECK FOR LOOSE CLAMP
KNOB
CHECK FOR MISSING HARDWARE

TA126984


BRAKE DRUM
BRAKE FLANGE
ACTUATING LEVER CHECK FOR MOVEMENT, MISSING HARDWARE
CAP SCREWS AND LOCK WASHERS

TA126985

Step 2. Check for missing or loose clamps, and missing hardware at parking brake cable connections to parking brake lever and actuating lever (para 2-42a).

a. Install missing parts, tighten loose parts, and/or adjust parking brake linkage (para 2-42a).

b. If parts are not missing, loose or require adjustment, replace parking brake cable (para 2-42a).

Step 3. Remove six cap screws and lock washers securing brake drum to brake flange (para 2-42b). Inspect brake linings for worn condition and actuating lever for damage (para 2-42b).

Replace worn brake linings and/or damaged actuating lever (para 2-42b).

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. UNEVEN OR ERRATIC SERVICE BRAKES

Step 1. Check if air pressure is the same in each tire (should be 45 PSI).

a. If air pressure in each tire is not 45 PSI, adjust tire pressure.

b. If air pressure is okay, proceed to step 2.

Step 2. Check hydraulic brake valve for leaking condition (para 2-43c).

a. If hydraulic brake valve is leaking, replace it (para 2-43c).

b. If hydraulic brake valve is okay, proceed to step 3.

Step 3. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is applied.

WARNING

Before raising wheel off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jacks or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels from ground.
Remove both wheel axle shafts and hub and drum assemblies (para 2-39f).
Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).
Repeat for other axle and wheels.

a. If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

b. If wheel cylinder is okay, proceed to step 4.

Step 4. Check brake linings for wear, uneven wear, glaze, brake fluid or lubricant contamination, or excessive dust.

a. Replace brake linings if worn, glazed, or contaminated; remove excessive dust (para 2-43a).

b. If brake linings are okay, proceed to step 5.

Step 5. Check hub and drum assemblies for scored or cracked condition (para 2-39f).

a. Replace brake drums if scored or cracked (para 2-39f).

b. If hub and drum assemblies are okay, proceed to step 6.

Step 6. Check for loose, missing, or damaged brake shoe mounting hardware (para 2-43a).

Replace missing or damaged brake shoe mounting hardware; install new hardware if missing.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. SERVICE BRAKES SPONGY

NOTE

If service brakes are spongy, bleed air from brake system as described in paragraph 2-43a. If brakes are still spongy, then proceed to step 1 below.

Step 1. Check brake lines and connections between hydraulic brake valve and wheel cylinders for brake fluid leaks (para 2-43b).

a. If connections are leaking fluid, tighten; if brake lines are leaking fluid, replace (para 2-43b).

b. If brake lines and connections are okay, proceed to step 2.

Step 2. Check hydraulic brake valve for leaking condition (para 2-43c).

a. If hydraulic brake valve master cylinder is leaking fluid, replace it (para 2-43c).

b. If hydraulic brake valve is okay, proceed to step 3.

Step 3. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is applied.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels from ground.
Remove both wheel axle shafts and hub and drum assembles (para 2-39f).
Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).
Repeat for other axle and wheels.

a. If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

b. If wheel cylinder is okay, reinstall hub and drum assemblies and axle shafts (para 2-39f), lower axle and wheels to ground, remove shipping lock pin (store under operator's seat) and remove blocks from wheels. Replace or repair hydraulic brake valve master cylinder (para 2-43c(1)).

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. SERVICE BRAKES GRAB

Step 1. Check source of brake fluid to ensure that brake fluid is correct; also check for contaminated brake fluid.

a. If incorrect brake fluid was used or if brake fluid is contaminated, drain brake system of brake fluid and refill using correct brake fluid (refer to current lubrication order) (para 2-43a).

b. If brake fluid is okay, proceed to step 2.

Step 2. Check brake pedal/return spring linkage for binding, interference, missing parts, or damage (para 2-43e).

a. If brake pedal/return spring linkage is binding, has interference, is missing parts or damaged, repair or replace (para 2-43e).

b. If brake pedal/return spring are okay, proceed to step 3.

Step 3. Check hydraulic brake valve for damage/leaking condition (para 2-43c).

a. If hydraulic brake valve is damaged or leaking, repair or replace it (para 2-43c).

b. If hydraulic brake valve is okay, proceed to step 4.

Step 4. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is in released position.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Rotate wheel by hand; there should be a very slight drag on wheel.
Repeat above for remaining wheel and axle.

a. If there is a very slight drag on wheels, proceed to step 5.

b. If there is excessive drag on wheels, adjust brakes (para 2-43a).

Step 5. Remove axle shafts and hub and drum assemblies from one axle (para 2-39f).
Check brake shoe return spring (para 2-43a).
Repeat above for remaining axle.

a. If brake shoe return spring is permanently set, replace (para 2-43a).

b. If brake shoe return spring is okay, proceed to step 6.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. SERVICE BRAKES GRAB (cont)

Step 6. Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).

a. If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

b. If wheel cylinder is okay, reinstall hub and drum assemblies and axle shafts (para 2-39f), lower axle and wheels to ground, remove shipping lock pin (store under operator's seat) and remove blocks from wheels. Replace or repair hydraulic brake valve (para 2-43c).

5. SERVICE BRAKES SQUEAK

Step 1. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is in applied position.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Remove axle shafts and hub drum assemblies (para 2-39f).
Check brake linings for wear, uneven wear, glaze, brake fluid or lubricant contamination, and/or excessive dust.
Repeat for other axle and wheels.

a. Replace brake linings that are worn, glazed or contaminated; remove excessive dust (para 2-43a).

b. If brake linings are okay and there is no excessive dust, proceed to step 2.

Step 2. Check hub and drum assembly for scored condition (para 2-39f).

a. If hub and drum assembly is scored, replace brake drum (para 2-39f).

b. If hub and drum assembly is okay, check for damaged brake shoe return spring (para 2-43a); replace brake shoe return spring (para 2-43a).

6. SERVICE BRAKES OVERHEAT

Step 1. Check brake pedal/return spring linkage for binding, interference, missing parts, or damage (para 2-43e).

a. If brake pedal/return spring linkage is binding, has interference, is missing parts or damaged, repair or replace (para 2-43e).

b. If brake pedal/return spring are okay, proceed to step 2.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. SERVICE BRAKES OVERHEAT (cont)

Step 2. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is in released position.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Rotate wheel by hand; there should be a very slight drag on wheel.
Repeat above for remaining wheel and axle.

a. If there is a very slight drag on wheels, proceed to step 3.

b. If there is excessive drag on wheels, adjust brakes (para 2-43a).

Step 3. Remove axle shafts and hub and drum assemblies from one axle (para 2-39f).
Check brake shoe return spring (para 2-43a).
Repeat above for remaining axle.

a. If brake shoe return spring is permanently set, replace (para 2-43a).

b. If brake shoe return spring is okay, proceed to step 4.

Step 4. Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).

If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

7. EXCESSIVE SERVICE BRAKE PEDAL TRAVEL

NOTE

If there is excessive brake pedal travel, add brake fluid to master cylinder (para 2-43c(1)) and bleed air from brake system as described in paragraph 2-43a. If brake pedal travel is still excessive proceed to step 1 below.

Step 1. Check adjustment of service brake pedal free travel (para 2-43e).

a. If service brake pedal is not adjusted properly, adjust (para 2-43e).

b. If adjustment is okay, proceed to step 2.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. EXCESSIVE SERVICE BRAKE PEDAL TRAVEL (cont)

Step 2. Check hydraulic brake valve for damage/leaking condition (para 2-43c).

a. If hydraulic brake valve is damaged or leaking, repair or replace it (para 2-43c).

b. If hydraulic brake valve is okay, proceed to step 3.

Step 3. Check brake lines and connections between hydraulic brake valve and wheel cylinders for brake fluid leaks (para 2-43b).

a. If connections are leaking fluid, tighten; if brake lines are leaking fluid, replace (para 2-43b).

b. If brake lines and connections are okay, proceed to step 4.

Step 4. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is applied.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels from ground.
Remove both axle shafts and hub and drum assemblies (para 2-39f).
Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).
Repeat for other axle and wheels.

a. If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

b. If wheel cylinder is okay, proceed to step 5.

Step 5. Check brake linings for excessive wear (para 2-43a).

a. If brake linings are worn excessively, replace (para 2-43a).

b. If brake linings are not worn excessively, adjust brakes (para 2-43a).

8. EXCESSIVE SERVICE BRAKE PEDAL EFFORT REQUIRED

Step 1. Check brake lines and connections between hydraulic brake valve and wheel cylinders for brake fluid leaks (para 2-43b).

a. If connections are leaking fluid, tighten; if brake lines are leaking fluid, replace (para 2-43b).

b. If brake lines and connections are okay, proceed to step 2.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

8. EXCESSIVE SERVICE BRAKE PEDAL EFFORT REQUIRED (cont)

Step 2. Check brake pedal/return spring linkage for binding, interference, missing parts, or damage (para 2-43e).

a. If brake pedal/return spring linkage is binding, has interference, is missing parts or damaged, repair or replace (para 2-43e).

b. If brake pedal/return are okay, proceed to step 3.

Step 3. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis. Ensure that parking brake is applied.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels from ground.
Remove both axle shafts and hub and drum assemblies (para 2-39f).
Check wheel cylinders for leaking condition or sticking piston (para 2-43a, step 1).
Repeat for other axle and wheels.

a. If wheel cylinder is leaking or piston is sticking, replace wheel cylinder (para 2-43a).

b. If wheel cylinder is okay, proceed to step 4.

Step 4. Check brake linings for wear, glaze, and excessive dust (para 2-43a).

a. Replace brake linings if worn, or glazed; remove excessive dust (para 2-43a).

b. If brake linings are okay, reinstall hub and drum assemblies, axle shafts (para 2-39f), lower axle and wheels to ground, remove shipping lock pin (store under operator's seat) and remove blocks from wheels. Proceed to step 5.

Step 5. Operate all control levers several times with engine off to relieve hydraulic pressure. Depress service brake pedal and note pedal effort required. Start engine, depress service brake pedal and note pedal effort required.

a. If required pedal effort is the same with engine off or on, proceed to step 6.

b. If less pedal effort is required with engine running, proceed to step 7.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

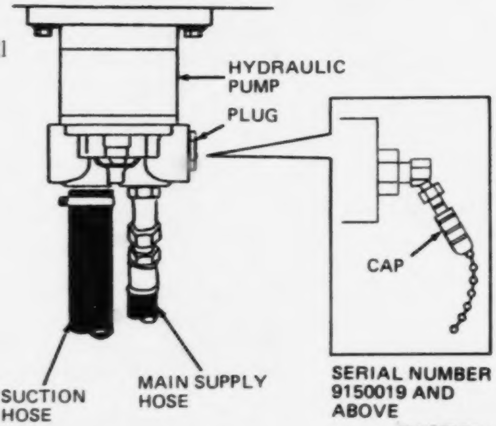
8. EXCESSIVE SERVICE BRAKE PEDAL EFFORT REQUIRED (cont)

Step 6. Operate lift control lever with engine at full throttle. Check that mast assembly operates normally.

a. If mast assembly operates normally, proceed to step 7.

b. If mast assembly does not operate normally, troubleshoot hydraulic system (para 2-46, MALFUNCTION 1).

Step 7. Operate all levers several times with engine off. Remove plug or cap from hydraulic pump and install 0-3000 PSI pressure gage.


HYDRAULIC PUMP
PLUG
CAP
SUCTION HOSE
MAIN SUPPLY HOSE
SERIAL NUMBER 9150019 AND ABOVE

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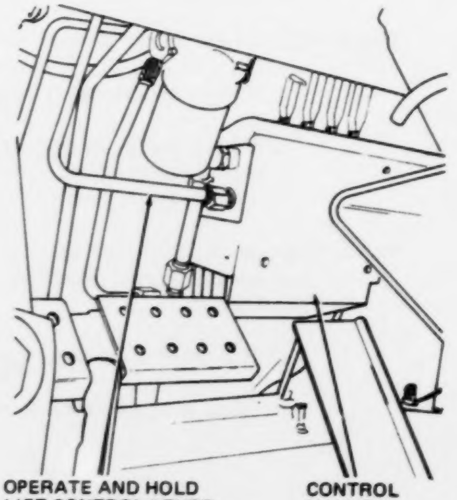
Start engine and, with transmission in neutral, operate at fast idle.
Operate and hold lift control lever toward you until tube assembly is warm to touch (mast assembly will be at full height).


OPERATE AND HOLD LIFT CONTROL LEVER TOWARDS YOU UNTIL THIS TUBE ASSEMBLY IS WARM TO TOUCH
CONTROL VALVE

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2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

8. EXCESSIVE SERVICE BRAKE PEDAL EFFORT REQUIRED (cont)

Step 7. (cont)

Operate engine at 1700 to 1900 RPM. With lift control lever held towards you, note and record pressure gage reading; then pump service brake pedal several times.
Depress service brake pedal and record new pressure gage reading.
Compare difference between pressure gage readings (relief pressure).

If difference between pressure gage readings is not 245 to 255 PSI replace or repair power assist unit (para 2-43c(2)).

9. SERVICE BRAKES GROAN AT END OF STOP

Step 1. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving.
Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis.
Ensure that parking brake is applied.

WARNING

Before raising wheel off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels from ground.
Remove both axle shafts and hub and drum assemblies (para 2-39f).
Check brake linings for wear, uneven wear, brake fluid/lubricant contamination, or excessive dust (para 2-43a).
Repeat for other axle.

a. Replace brake linings if worn or contaminated; remove excessive dust (para 2-43a).

b. If brake linings are okay, proceed to step 2.

Step 2. Check hub and drum assemblies for scored or cracked condition (para 2-39f).

a. Replace brake drums if scored or cracked (para 2-39f).

b. If hub and drum assemblies are okay, proceed to step 3.

Step 3. Check for loose, missing, or damaged brake shoe mounting hardware (para 2-43a).

Replace missing or damaged brake shoe mounting hardware; install new hardware if missing.

10. SCRAPING NOISE FROM SERVICE BRAKES WHEN APPLIED

Step 1. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving.
Remove shipping lock pin from storage area under operator's seat (para 2-4b(1)) and install in chassis.
Ensure that parking brake is applied.

2-41. BRAKE SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

10. SCRAPING NOISE FROM SERVICE BRAKES WHEN APPLIED (cont)

Step 1. (cont)

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Remove both axle shafts and hub and drum assemblies (para 2-39f).
Check brake linings for wear, uneven wear, brake fluid/lubricant contamination (para 2-43a).
Repeat for other axle.

a. Replace brake linings if worn or contaminated (para 2-43a).

b. If brake linings are okay, proceed to step 2.

Step 2. Check brake shoe return springs for damage (para 2-43a).

a. Replace spring if damaged (para 2-43a).

b. If spring is okay, check brake assemblies for loose or missing brake shoe mounting hardware; tighten/replace brake shoe mounting hardware (para 2-43a).

11. STOP LIGHT INOPERATIVE

Refer to paragraph 2-24, MALFUNCTION 4 for troubleshooting procedures.

12. DECLUTCH PEDAL DOES NOT NEUTRALIZE TRANSMISSION

Disconnect center propeller shaft from brake flange (para 2-39). Block wheels, lightly apply parking brake, and idle engine. Observe transmission output shaft (brake flange) while an assistant depresses service brake pedal.

a. If brake flange stops rotating, check adjustment of declutch valve (para 2-43d). If adjustment is correct, replace declutch valve (para 2-43d).

b. If brake flange does not stop rotating, replace transmission control valve assembly (notify direct support maintenance).

2-42. PARKING BRAKE MAINTENANCE

a. Parking Brake Linkage.

This task covers:
a. Inspection
b. Removal
c. Cleaning
d. Inspection/Repair
e. Installation/Replacement
f. Adjustment

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

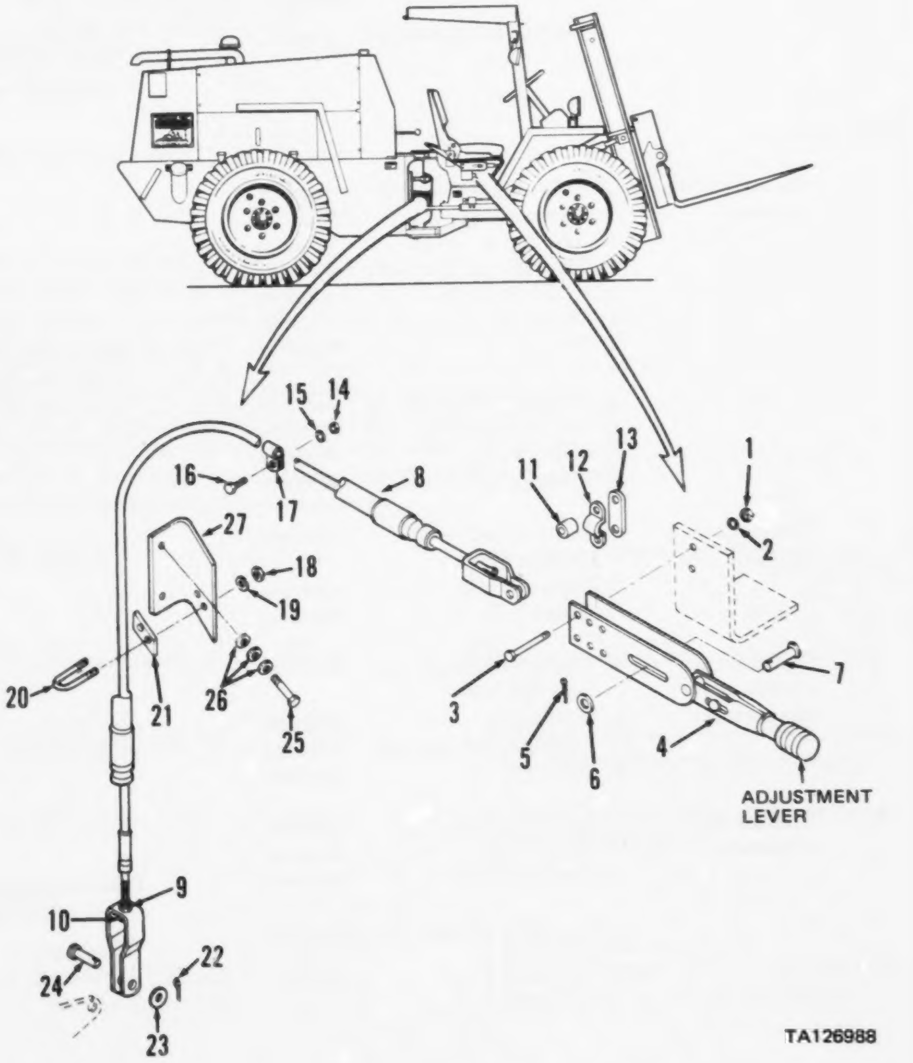
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Clean diesel fuel

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, turned (articulated) left, engine off, and parking brake lever released.

KEY

1. Nuts
2. Lock washers
3. Cap screws
4. Parking brake lever
5. Cotter pin
6. Washer
7. Pin
8. Parking brake cable
9. Adjusting nut
10. Adjusting nut
11. Spacers
12. Clamp
13. Clamp spacer
14. Nut
15. Lock washer
16. Cap screw
17. Clamp
18. Nuts
19. Lock washers
20. U bolt
21. Plate
22. Cotter pin
23. Washer
24. Clevis pin
25. Cap screws
26. Washers
27. Bracket



2-42. PARKING BRAKE MAINTENANCE (cont)

a. Parking Brake Linkage (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Operator's compartment	a. Parking brake lever (4)	Inspect for loose or missing hardware	Tighten loose hardware; replace missing hardware
		b. Parking brake cable (8)	Inspect for loose or missing hardware	Tighten loose hardware; replace missing hardware
		c. Parking brake lever (4)	Apply	If linkage seems too loose as indicated by lever moving too freely, adjust as described in step 19 below
REMOVAL				
2	Operator's compartment	a. Two nuts (1) and lock washers (2)	Remove	
		b. Two cap screws (3)	Remove	
		c. Parking brake lever (4)	Remove	
		d. Cotter pin (5)	Remove	
		e. Washer (6)	Remove	
		f. Pin (7)	Remove	Disconnects parking brake cable (8) clevis from lever (4)
		g. Parking brake cable (8)	Disengage	From lever (4)
		h. Two spacers (11)	Remove	
		i. Clamp (12)	Remove	
		j. Clamp spacer (13)	Remove	
3	Operator's compartment, rear	a. Nut (14) and lock washer (15)	Remove	
		b. Capscrew (16)	Remove	
		c. Clamp (17)	Remove	
4	Transmission, left side above parking brake	a. Two nuts (18) and lock washers (19)	Remove	
		b. U bolt (20)	Remove	
		c. Parking brake cable (8)	Relocate	Away from bracket (27)
		d. Plate (21)	Remove	
5	Parking brake actuating lever	a. Cotter pin (22)	Remove	
		b. Washer (23)	Remove	
		c. Clevis pin (24)	Remove	Disconnects parking brake cable clevis from actuating lever
		d. Parking brake cable (8)	Remove	

2-42. PARKING BRAKE MAINTENANCE (cont)

a. Parking Brake Linkage (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
		NOTE Don't perform following step unless bracket (27) requires replacement.		
6	Transmission, left side, above parking brake	a. Two cap screws (25) and six washers (26) b. Bracket (27)	Remove Remove	
CLEANING				
7		Parking brake cable (8)	Clean	Use clean diesel fuel
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
8		All other parts	Clean	Use cleaning solvent P-D-680
INSPECTION/REPAIR				
9		Parking brake lever (4)	Inspect	Replace if dented, bent, or lever action is rough
10		Parking brake cable (8)	Inspect	Replace if clevis mounting holes elongated, or if cable kinked or threads damaged
11		All other parts	Inspect	Replace if damaged, worn, bent, distorted, or threads damaged
INSTALLATION/REPLACEMENT				
12	Transmission, left side, above parking brake	a. Bracket (27) b. Six washers (26) and two cap screws (25)	Position Install	On transmission rear cover Place three washers (26) on cap screw (25); tighten to 37-41 pounds foot torque

2-42. PARKING BRAKE MAINTENANCE (cont)

a. Parking Brake Linkage (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
13	Parking brake cable (8)	a. Adjusting nut (10)	Loosen	Until just held onto cable by three or four threads
		b. Adjusting nut (9)	Adjust	Until just touches top of clevis
14	Parking brake actuating lever	a. Parking brake cable (8)	Position clevis on actuating lever; align holes	Clevis on threaded end of cable (8) connects to actuating lever
		b. Clevis pin (24)	Install	Connect parking brake cable (8) clevis to actuating lever
		c. Washer (23)	Position	
		d. Cotter pin (22)	Install	Bend over end
15	Transmission, left side, above parking brake	a. Plate (21)	Position	Between parking brake cable (8) and bracket (27)
		b. U bolt (20)	Install	Secures parking brake cable (8) and plate (21)
		c. Two lock washers (19) and nuts (18)	Install	
16	Operator's compartment, rear	a. Clamp (17)	Install and position	On parking brake cable (8)
		b. Cap screw (16)	Install	Secures clamp (17) to rear chassis
		c. Lock washer (15) and nut (14)	Install	
17	Parking brake lever (4)	a. Parking brake cable (8) clevis	Position	In lever (4); align holes in clevis and lever
		b. Pin (7)	Install	Connects clevis and lever (4)
		c. Washer (6)	Position	
		d. Cotter pin (5)	Install	Bend over end
		e. Cap screw (3)	Position	In parking brake lever just far enough to install spacers (11) on cap screw
		f. Two spacers (11)	Position	On cap screw (3)
		g. Clamp (12) and clamp spacer (13)	Position and install	On parking brake cable (8), then install in parking brake lever (4) threading screw through spacer (11), clamp (12) and clamp spacer (13)
18	Operator's compartment	a. Parking brake lever (4)	Position	
		b. Two lock washers (2), cap screws (3) and nuts (1)	Install	

2-42. PARKING BRAKE MAINTENANCE (cont)

a. Parking Brake Linkage (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT				
19	Operator's compartment	Parking brake lever (4)	Adjust	With lever in released position, turn adjustment knob located on top of lever fully counterclockwise until it no longer can be turned
		NOTE Be sure you don't have parking brake lever in applied position (horizontal) when performing following step.		
20	Transmission parking brake actuating lever	a. Adjusting nut (9)	Adjust	Thread all the way up
		b. Adjusting nut (10)	Adjust upwards	Until all slack is removed from parking brake cable (8)
		c. Adjusting nut (9)	Tighten	Against parking brake cable (8) clevis
21	Operator's compartment	Parking brake lever (4)	Adjust	Turn knob located on top of lever (4) clockwise. Apply parking brake; if considerable force is required to pull lever up, back-off parking brake lever adjustment knob

2-42. PARKING BRAKE MAINTENANCE (cont)

b. Parking Brake Assembly.

This task covers:
- a. Inspection
- b. Removal
- c. Cleaning
- d. Inspection (after removal)
- e. Repair
- f. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Hand Vacuum Cleaner	
Hard Wooden Blocks (2), 6 by 6 by 18 inches	

MATERIALS/PARTS

Cleaning solvent P-D-680	
Clean cloths	
Seal	
Brake lining and rivet kit	(FSCM 12603 P/N 801214)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off
	Vehicle parked on level surface with wheels blocked.
	Transmission DIRECTION SELECTOR lever in neutral (N) position.
2-42a	Parking brake linkage disconnected from parking brake lever cam.
2-39b	Center drive shaft assembly removed.

NOTE

To perform inspection procedure, it is not necessary to disconnect parking brake linkage or remove center drive shaft assembly.

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Transmission, rear	a. Six cap screws (1) and lock washers (2)	Remove	Support brake drum (3)
		b. Brake drum (3)	Move out of position	Over center drive shaft
		c. Shoe and lining (9)	Inspect	Replace if less than 1/8 inch thick in any area
		d. Brake drum (3)	Inspect	Replace if cracked or scored

NOTE

If shoe and lining, or brake drum require replacement, remove center drive shaft (para 2-39b) and disconnect linkage from parking brake lever cam (para 2-42a). Proceed to step 2c below. If shoe and lining and brake drum are okay, proceed to step 1e below.

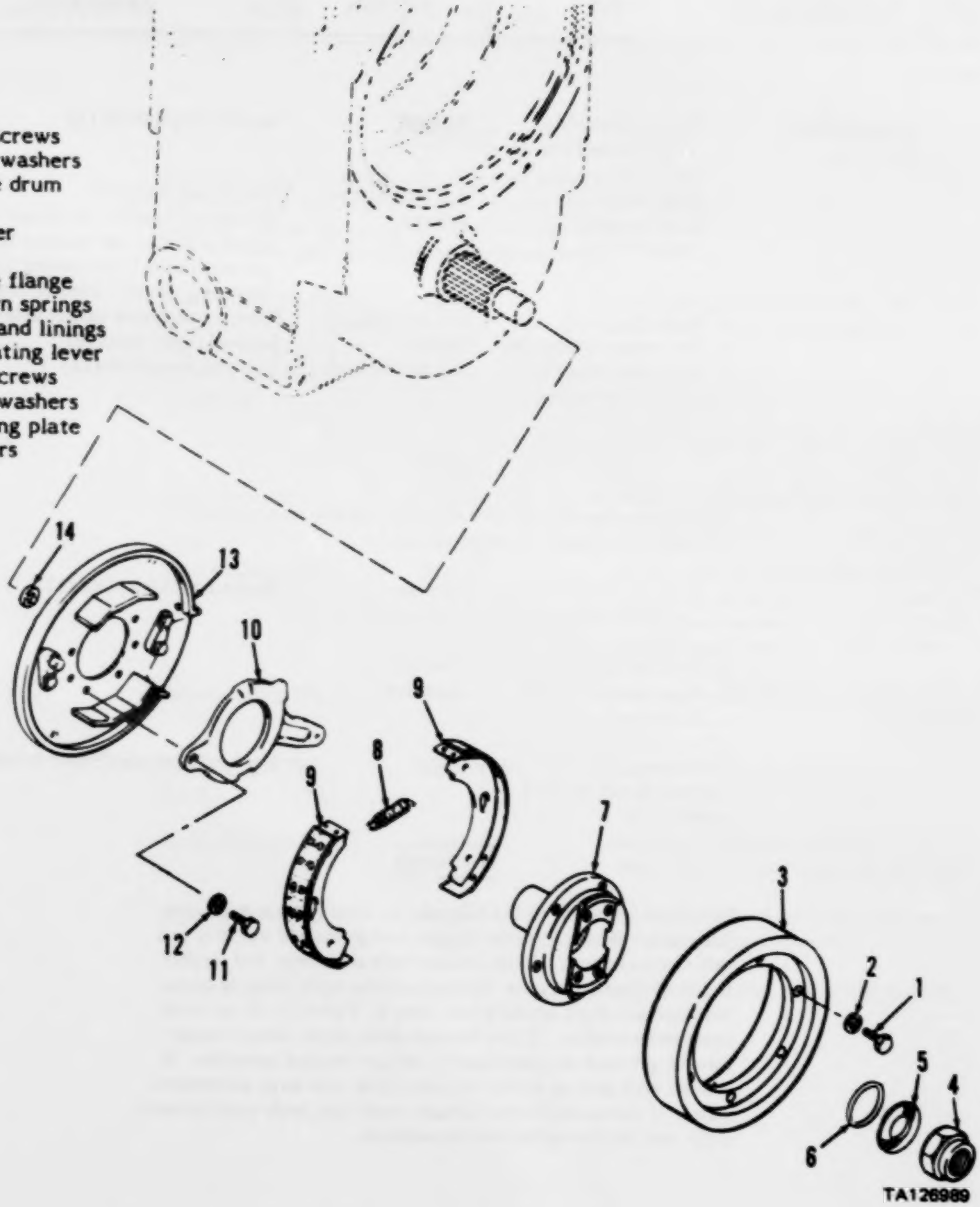
STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Brake drum (3)	Position	On brake flange
		f. Six lock washers (2) and cap screws (1)	Install	Tighten to 41-49 pounds foot torque

2-42. PARKING BRAKE MAINTENANCE (cont)

b. Parking Brake Assembly (cont).

KEY

1. Cap screws
2. Lock washers
3. Brake drum
4. Nut
5. Washer
6. Seal
7. Brake flange
8. Return springs
9. Shoe and linings
10. Actuating lever
11. Cap screws
12. Lock washers
13. Backing plate
14. Spacers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2-42. PARKING BRAKE MAINTENANCE (cont)

b. Parking Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
2	Transmission rear	a. Six cap screws (1) and lock washers (2)	Remove	Support brake drum (3)
		b. Brake drum (3)	Pull and remove	From brake flange (7)
		c. Nut (4), washer (5) and seal (6)	Remove	Use impact wrench. If impact wrench is not available, use retainer bar to prevent flange from turning while loosening nut (4). Discard seal (6)
		d. Brake flange (7)	Pull and remove	From transmission output shaft
		e. Two return springs (8)	Remove	Support brake shoes (9)
		f. Shoe and lining (9) and actuating lever (10)	Pull and remove	From backing plate (13)

NOTE

Remove cap screws (11), lock washers (12) and backing plate (13) only if necessary for replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Four cap screws (11) and lock washers (12)	Remove	Support backing plate (13)
		h. Backing plate (13)	Remove	
		i. Four spacers (14)	Remove	
CLEANING				
3		Brake drum (3), shoe and lining (9) and backing plate (13)	Clean	Use hand vacuum cleaner to remove dust

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-42. PARKING BRAKE MAINTENANCE (cont)

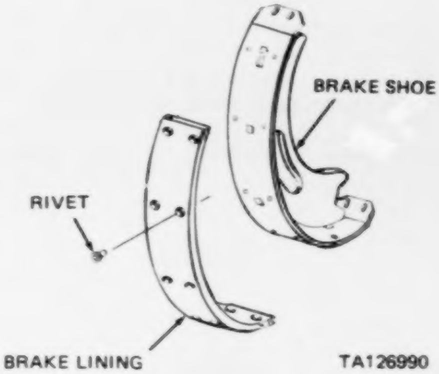
b. Parking Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		Brake drum (3), flange (7), spring (8), actuating lever (10), backing plate (13) and all hardware	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
5		Brake drum (3)	Inspect	Replace if cracked, scored or excessively worn
6		Shoe and lining (9)	Inspect	Repair if linings scored, cracked, deteriorated or excessively worn. Replace if brake shoe cracked, or if pawl holes or lever contact areas excessively worn
7		Return springs (8)	Inspect	Replace if coils broken, or if distorted or stretched
8		Brake flange (7)	Inspect	Replace if cracked, or if spline teeth burred, chipped or excessively worn
9		Actuating lever (10)	Inspect	Replace if cracked or distorted, or if roller out-of-round or excessively worn
10		Backing plate (13)	Inspect	Replace if cracked, or if pivot points (pawls) excessively worn
11		All hardware	Inspect	Replace if cracked, worn, or if threads damaged

2-42. PARKING BRAKE MAINTENANCE (cont)

b. Parking Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REPAIR				
12	Brake shoe and lining (9)	a. Ten rivets	Remove	Cut or drill from brake lining and shoe



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WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Brake shoe	Remove and clean	Use cleaning solvent P-D-680 on shoe contact face. Dry thoroughly with compressed air
		c. New brake lining	Position and clamp	Clamp lining to shoe with C clamps so rivet holes are in alignment
		d. Ten new rivets	Install	Drive squarely into rivet holes with flat head drift

2-42. PARKING BRAKE MAINTENANCE (cont)

b. Parking Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)				
12 (cont)		**NOTE** Make certain lining is firmly clamped to brake shoe, locating C-clamps as close to rivet holes as possible.		
		e. Rivet heads	Form	Use rivet set, starting on center rivets and moving outwards toward sides and ends of lining
INSTALLATION/REPLACEMENT				
13	Transmission rear	a. Four spacers (14)	Position	On backing plate (13)
		b. Backing plate (13)	Position	On transmission
		c. Four lock washers (12) and cap screws (11)	Install and tighten	Tighten to 81-97 pounds foot torque
		d. Actuating lever (10)	Position	On backing plate pawl
		e. Shoe and lining (9)	Position	On backing plate pawls
		f. Two return springs (8)	Install	On brake shoes; top spring in inner holes on shoes; bottom spring in center holes on shoes.
		g. Brake flange (7)	Push on	Transmission output shaft
		NOTE Use impact wrench to tighten nut (4). If impact wrench is not available, temporarily install two bolts in brake flange (7), and insert retainer bar between bolts to prevent flange from turning while tightening nut (4).		
		h. New seal (6), washer (5) and nut (4)	Install and tighten	Tighten nut to 600-700 pounds foot torque
		i. Brake drum (3)	Position	On brake flange (7)
		j. Six lock washers (2) and cap screws (1)	Install and tighten	Tighten to 41-49 pounds foot torque
		k. Parking brake linkage	Reconnect and adjust	Para 2-42a

2-43. SERVICE BRAKE MAINTENANCE

a. Service Brake Assembly.

This task covers:

a. Inspection
b. Removal
c. Cleaning
d. Inspection (after removal)
e. Repair
f. Installation/Replacement
g. Adjustment
h. Bleeding brakes

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Shop Vacuum Cleaner
Hard Wooden Blocks (2), 6 by 6 by 18 inches

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	Vehicle parked on level surface, wheels blocked and parking brake applied.
2-47	Wheel removed.
2-39f	Axle shaft and hub and drum assembly removed.

WARNING

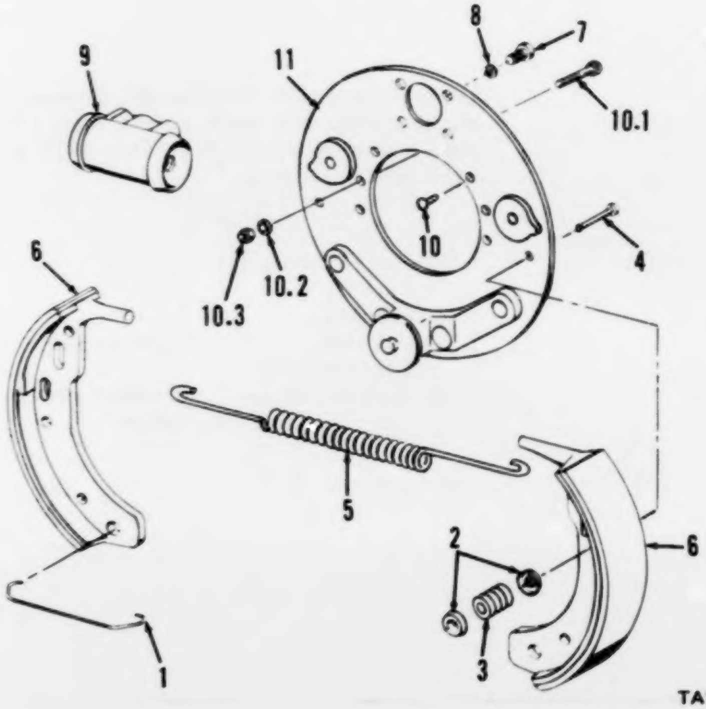
Tire and wheel assembly must be removed before removing axle shaft and hub and drum assembly to avoid damaging axle oil seal. Damage to seal can result in contamination of brake linings and brake failure.

MATERIAL/PARTS

Brake fluid, silicone (MIL-B-46176)
Cleaning solvent P-D-680

KEY

1. Retainer spring
2. Hold-down retainers
3. Hold-down springs
4. Anti-rattle rods
5. Return spring
6. Shoe and linings
7. Cap screws
8. Lock washers
9. Wheel cylinder
10. Rivets
10.1 Capscrews
10.2 Washers
10.3 Nuts
11. Backing plate and cam bolt assembly



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2-43. SERVICE BRAKE MAINTENANCE (cont)

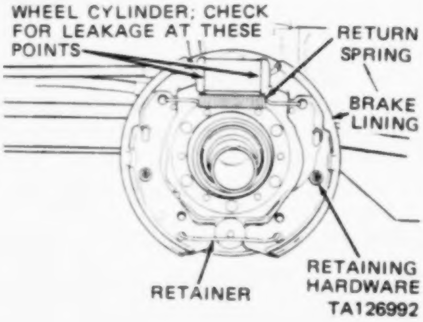
a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Front axle, right side	a. Shoe and linings (6)	Inspect for wear and signs of overheating and lubricant contamination	Replace if worn to 3/32 inch or less; or if contaminated by lubricant or brake fluid

CAUTION

Don't depress brake pedal completely in following step; depress pedal only enough to check that brake shoes expand.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Wheel cylinder (9)	Inspect for fluid leakage at boots. Depress brake pedal and check that brake shoes expand. Release brake pedal and check that brake shoes retract	Replace if necessary



NOTE

If brake shoes don't expand or retract in the above step, this indicates that wheel cylinder piston is sticking.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Retaining hardware	Inspect for missing parts	Replace missing parts

NOTE

If brake shoes, wheel cylinder, or retaining hardware are okay, reinstall axle shaft and hub assembly (para 2-39f) and wheel assembly and perform above procedures on remaining wheel and axle. If brake shoes, wheel cylinder, or retaining hardware are not okay or other problems are observed, proceed to step 2 below.

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
2	Front axle, right side	a. Retainer spring (1)	Remove	Use brake spring pliers
		b. Head of two anti-rattle rods (4)	Hold	From turning
		c. Two outer retainers (2)	Depress and turn	Use pliers, turn 1/4 turn, slowly release spring pressure, and remove
		d. Two springs (3) and inside retainers (2)	Remove	From two rods (4)
		e. Two rods (4)	Remove	Pull from shoe assembly (6) and backing plate (11)
		f. Return spring (5)	Remove	Use brake spring pliers
		g. Two shoe and lining assemblies (6)	Remove	From backing plate (11)
3	Front axle backing plate, right side	**NOTE** Remove cap screws (7), lock washers (8) and wheel cylinder (9) only if required for replacement.		
		a. Brake tube and fitting	Remove	From wheel cylinder (para 2-43b)
		b. Two cap screws (7) and lock washers (8)	Remove	Support wheel cylinder (9)
		c. Wheel cylinder (9)	Remove	From backing plate (11)
CLEANING				
4		Brake lining (6) and wheel cylinder (9)	Clean	Wipe with a clean, dry cloth only

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4 (cont)				

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
6		Shoe and lining (6)	Inspect	Replace if lining glazed, scored, cracked, deteriorated, worn to 3/32 inch or less, or if brake shoe or pawl holes worn
7		Springs (1, 3, and 5)	Inspect	Replace if bent, cracked, distorted or stretched
8		Retainer (2) and rod (4)	Inspect	Replace if cracked, bent or corroded
9		Cap screws (7) and lock washers (8)	Inspect	Replace if worn, or if threads damaged

NOTE

Inspect under wheel cylinder (9) rubber boots for damage.

STEP	LOCATION	ITEM	ACTION	REMARKS
10		Wheel cylinder (9)	Inspect	Replace if leaking, cracked, chipped, threads damaged, or rubber boots deteriorated.
11		Backing plate (11)	Inspect	Replace if worn, distorted or damaged, or if rivets loose or sheared (see step 12)

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REPAIR				
12	Front axle backing plate, right side	a. Six rivets (10) or six cap screws (10.1), washers (10.2), and nuts (10.3)	Remove	Drill and press rivets (10) if used, from plate (11) and axle housing. If cap screws (10.1), washers (10.2), and nuts(10.3) used, remove these parts. Support plate (11)
		b. Backing plate assembly (11)	Remove	Pull from axle housing
		c. New backing plate assembly (11)	Position	Clamp backing plate to axle housing with C clamps so rivet holes are in alignment
		NOTE Be sure wheel cylinder mounting holes in backing plate are at top of axle housing.		
		d. Six capscrews (10.1), washers (10.2), and nuts (10.3)	Install	
INSTALLATION/REPLACEMENT				
13	Front axle backing plate, right side	a. Wheel cylinder (9)	Position	On backing plate (11)
		b. Two lock washers (8) and cap screws (7)	Install and tighten	Until wheel cylinder is securely mounted
		c. Fitting and brake tube	Install and tighten	Until securely mounted to wheel cylinder
14	Front axle, right side	a. Two shoe and lining assemblies (6)	Position and install	Insert push rod end of shoe in wheel cylinder, and position shoe against backing plate adjustment cam and bottom pawl
		b. Two anti-rattle rods (4)	Position	Insert through hole in backing plate and brake shoe

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
14 (cont)		c. Two retainers (2) and springs (3)	Position and install	Guide one retainer and spring over rod (4), then push head of rod and outside retainer to compress spring. Rotate outside retainer 1/4 turn and release
		d. Retainer spring (1) and return spring (5)	Install	Use brake spring pliers
		e. Hub and drum assembly and axle shaft	Install	Para 2-39f

NOTE

Perform adjustment (step 15) before lowering vehicle wheel to ground.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Wheel	Install	Para 2-47
ADJUSTMENT				
15	Front axle backing plate, back (axle housing) side, right side of vehicle			

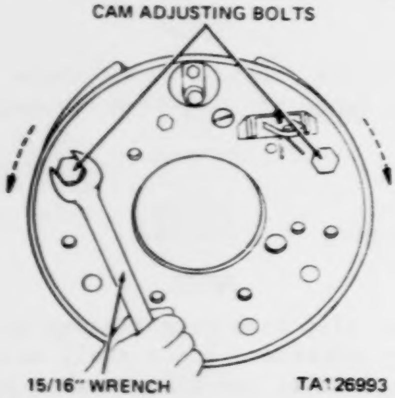
NOTE

If brake line was disconnected from wheel cylinder, bleed brakes (step 16) before adjusting brake lining-to-drum clearance.

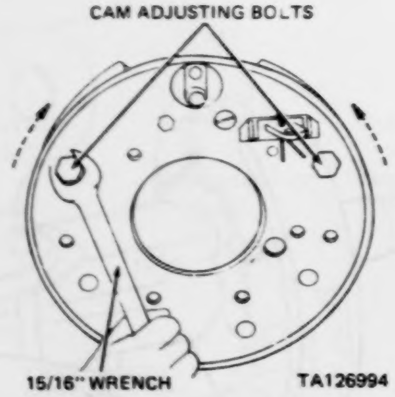
2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
15 (cont)		a. Brake pedal	Actuate	To center brake shoe and lining assemblies in drum
		b. Two cam adjusting bolts	Turn as shown	To expand brake shoes until slight drag can be felt while drum is rotating


CAM ADJUSTING BOLTS
15/16" WRENCH
TA126993

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Two cam adjusting bolts	Turn as shown	To contract brake shoes until drum rotates freely (no drag)


CAM ADJUSTING BOLTS
15/16" WRENCH
TA126994

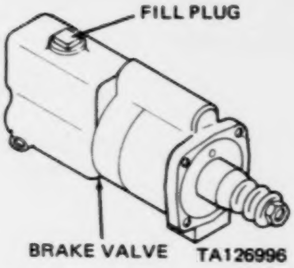
NOTE

After adjustment, repeat steps 1 through 15 above for remaining brake assemblies.

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

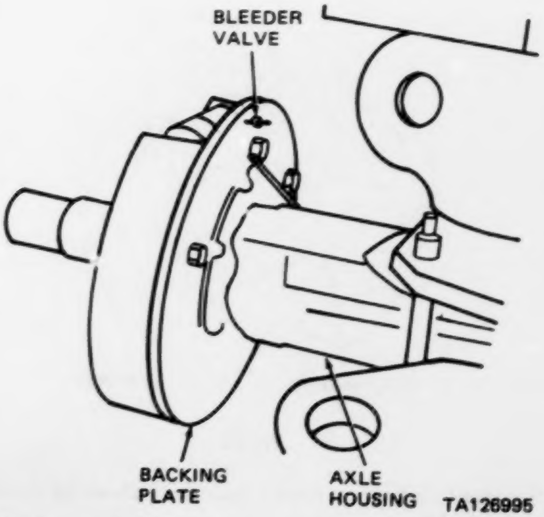
STEP	LOCATION	ITEM	ACTION	REMARKS
BLEEDING BRAKES				
16	Operator's compartment	a. Brake valve fill plug	Remove	
		b. Brake valve	Fill	With silicone brake fluid, MIL-B-46176, to within ⅛ inch of fill plug opening.
		c. Fill plug	Install	



NOTE

When bleeding brakes, slip hose over bleeder valve with opposite end of hose in clear container. Place small amount of brake fluid in container so that bubbles can be seen when bleeding brakes. Pressure bleeder may be used for bleeding brakes. Always bleed brakes with brake drum installed.

STEP	LOCATION	ITEM	ACTION	REMARKS
17	Rear axle backing plate, right side	a. Bleeder valve	Close	Turn clockwise



STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Brake pedal	Pump and hold down	Use assistant

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Service Brake Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
BLEEDING BRAKES (cont)				
17 (cont)		c. Bleeder valve	Momentarily open	Turn counterclockwise until brake pedal nears bottom of travel then turn clockwise to close

NOTE

Repeat steps b and c above until a steady stream of brake fluid flows from open bleeder valve when brake pedal is depressed.

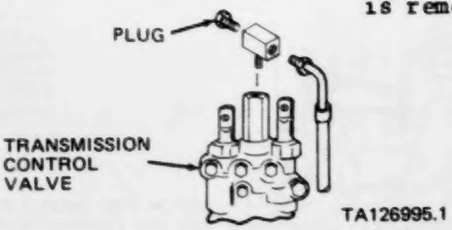
STEP	LOCATION	ITEM	ACTION	REMARKS
18	Operator's compartment	a. Brake valve fill plug	Remove	
		b. Brake valve	Refill	With silicone brake fluid, MIL-B-46176, to within ½ inch of fill plug opening.
		f. Fill plug	Install	

NOTE

Repeat steps 17 and 18 above at remaining bleeder valves in following order:

Left rear
Right front
Left front

STEP	LOCATION	ITEM	ACTION	REMARKS
19	Transmission control valve	a. Plug	Tighten	
		b. Declutch pedal	Hold down	Use assistant
		c. Plug	Momentarily open	Turn counterclockwise then clockwise to close when air is removed from line



NOTE

Repeat steps b and c above until a steady stream of brake fluid flows from loosened plug.

Repeat step 18 above to fill brake valve with brake fluid.

2-43. SERVICE BRAKE MAINTENANCE (cont)

b. Brake Hoses, Lines and Fittings.

This task covers:
- a. Leak Inspection
- b. Removal
- c. Cleaning
- d. Inspection
- e. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

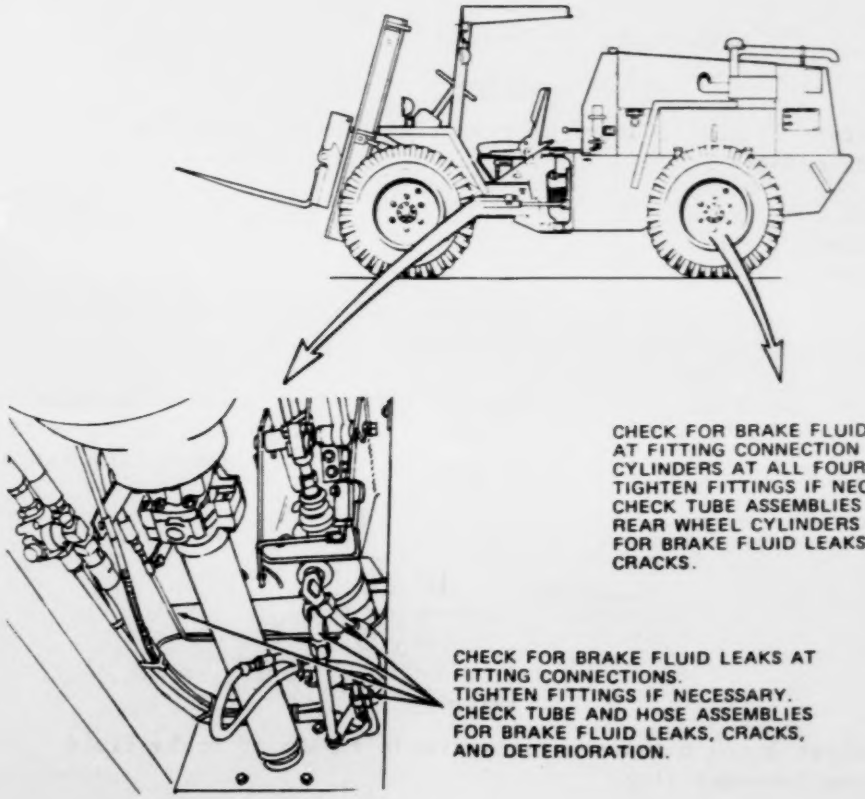
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Gaskets
Brake fluid (SAE J1703C)
Tie straps

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Left side panel removed.
2-53i	Chassis guard removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
LEAK INSPECTION				



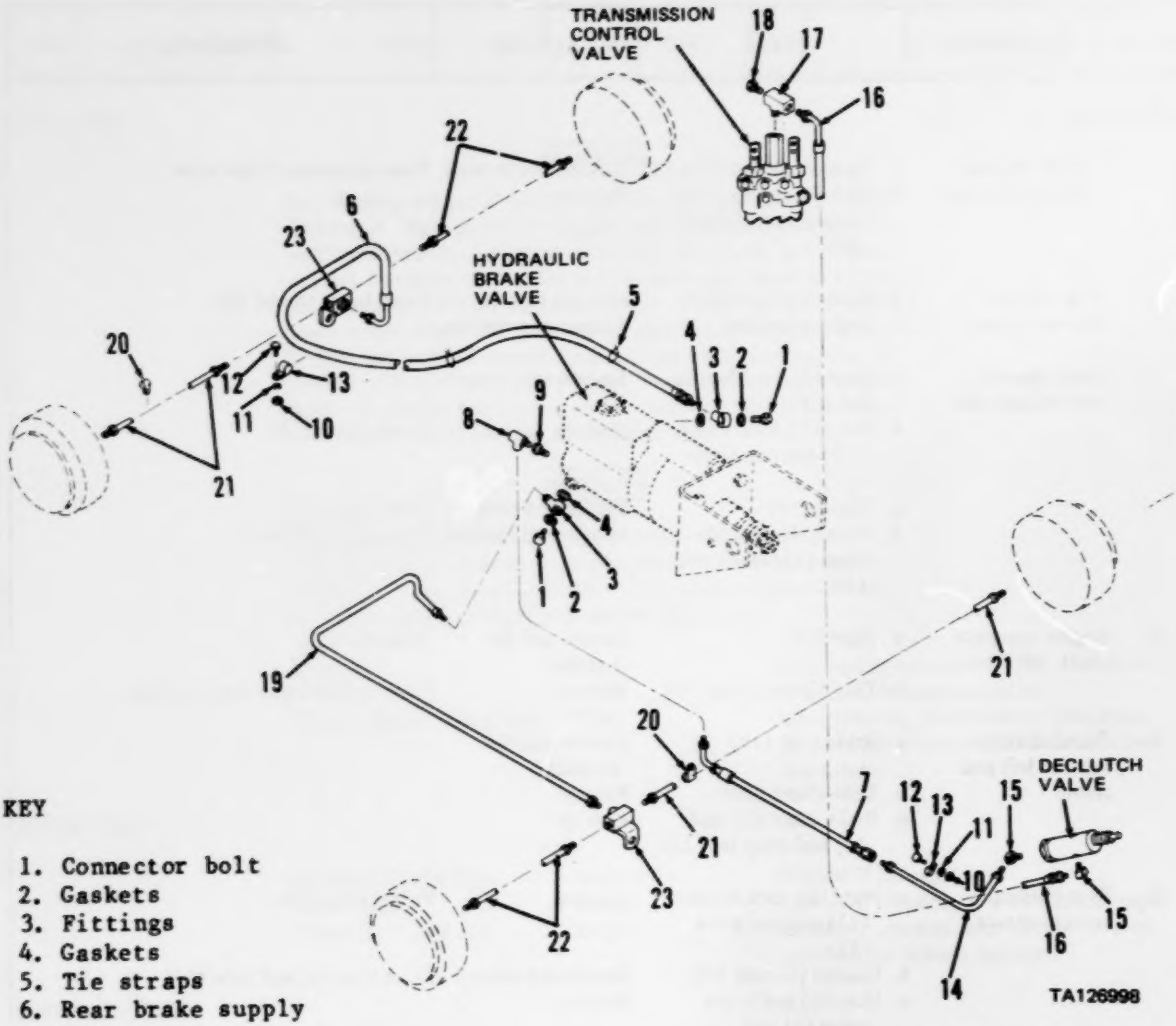
CHECK FOR BRAKE FLUID LEAKS AT FITTING CONNECTION TO WHEEL CYLINDERS AT ALL FOUR WHEELS. TIGHTEN FITTINGS IF NECESSARY. CHECK TUBE ASSEMBLIES BETWEEN REAR WHEEL CYLINDERS AND TEE FOR BRAKE FLUID LEAKS AND CRACKS.

CHECK FOR BRAKE FLUID LEAKS AT FITTING CONNECTIONS. TIGHTEN FITTINGS IF NECESSARY. CHECK TUBE AND HOSE ASSEMBLIES FOR BRAKE FLUID LEAKS, CRACKS, AND DETERIORATION.

TA126997

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Brake Hoses, Lines, and Fittings (cont).


TRANSMISSION CONTROL VALVE
18
17
16
22
6
23
HYDRAULIC BRAKE VALVE
5
20
12
13
11
10
4
3
2
1
9
8
21
4
3
1
2
19
21
20
DECLUTCH VALVE
7
12
13
11
15
21
10
23
22
16
15
14
TA126998

KEY

1. Connector bolt
2. Gaskets
3. Fittings
4. Gaskets
5. Tie straps
6. Rear brake supply hose
7. Declutch valve inlet hose
8. Tee
9. Fitting
10. Nuts
11. Lock washers
12. Cap screws
13. Clamps
14. Declutch valve inlet tube
15. Fittings
16. Declutch valve outlet hose
17. Tee
18. Plug
19. Front brake supply tube
20. Tube clamp
21. Long brake tube
22. Short brake tube
23. Strap tees

2-43. SERVICE BRAKE MAINTENANCE (cont)

b. Brake Hoses, Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis, bottom left side	a. Two connector bolts (1)	Loosen and remove	From hydraulic brake valve
		b. Two fittings (3) and four gaskets (2 and 4)	Remove	
2	Rear chassis, bottom center	a. Nine tie straps (5)	Cut and remove	From hoses (6 and 16)
		b. Brake hose (6)	Loosen and remove	
3	Front chassis, bottom left side	a. Hose (7), tee (8) and fitting (9)	Loosen and remove	
		b. Nut (10), lock washer (11) and cap screw (12)	Remove	From clamp (13)
		c. Clamp (13)	Spread and remove	From tube (14)
		d. Tube (14), two fittings (15) and hose (16)	Loosen and remove	From declutch valve
4	Engine compartment, left front	a. Hose (16)	Loosen and disconnect	From tee (17)
		b. Tee (17) and plug (18)	Remove	From transmission control valve
5	Front chassis, bottom left and center	a. Brake tube (19)	Loosen and disconnect	
		b. Tube clamp (20)	Remove	
		c. Brake tubes (21 and 22) and strap tee (23)	Remove	
6	Rear chassis, bottom center	a. Nut (10), lock washer (11) and cap screw (12)	Remove	From clamp (13)
		b. Clamps (13 and 20)	Spread and remove	From hose (6) and tube (21)
		c. Hose (6) and brake tubes (21 and 22)	Remove	
		d. Strap tee (23)	Remove	

2-43. SERVICE BRAKE MAINTENANCE (cont)

b. Brake Hoses, Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
7		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
8		Hoses, fittings, and tubes	Flush	After cleaning, flush interior with clean brake fluid to remove all traces of cleaning solvent
INSPECTION				
9		Clamps (13 and 20)	Inspect	Replace if damaged
10		All fittings	Inspect	Replace if cracked, or if threads damaged
11		Hoses (6, 7, and 16)	Inspect	Replace if cracked, split or deteriorated, or if fitting threads damaged
INSTALLATION				
12	Rear chassis, bottom center	a. Strap tee (23)	Position and install	On rear axle
		b. Hose (6) and brake tubes (21 and 22)	Install and and tighten	
		c. Two clamps (13 and 20)	Position	On hose (6) and brake tube (21)
		d. Cap screw (12), lock washer (11) and nut (10)	Install and tighten	Until clamp (13) is securely mounted

2-43. SERVICE BRAKE MAINTENANCE (cont)

b. Brake Hoses, Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
13	Engine compartment, left front	a. Tee (17) and plug (18)	Install and tighten	Until securely mounted to transmission
		b. Hose (16)	Connect to tee (17) and tighten	
		c. Nine tie straps (5)	Loop and tie	Around hoses (6 and 16)
14	Front chassis, bottom left and center	a. Strap tee (23)	Position and install	On front axle
		b. Brake tubes (21 and 22)	Install and tighten	
		c. Clamp (20)	Position and install	On tube (21)
		d. Supply tube (19)	Connect to tee (23) and tighten	
		e. Two fittings (15), hose (16) and tube (14)	Connect to declutch valve and tighten	
		f. Clamp (13)	Position	On tube (14)
		g. Cap screw (12), lock washer (11) and nut (10)	Install and tighten	Until clamp (13) is securely mounted
		h. Fitting (9), tee (8) and hose (7)	Connect to hydraulic brake valve and tighten	
		i. Two fittings (3)	Connect to hose (6) and tube (19) and tighten	
		j. Two fittings (3), four new gaskets (2 and 4) and connector bolts (1)	Connect to hydraulic brake valve and tighten	
		k. Inlet hose (7)	Connect to tube (14) and tighten	
		l. Brake lines	Bleed	Para 2-43a
		m. Brake pedal	Depress	With engine running. Check for proper brake operation

2-43. SERVICE BRAKE MAINTENANCE (cont)

a. Hydraulic Brake Valve (cont).

(1) Brake Master Cylinder (cont).

This task covers:
- a. Leak Inspection
- b. Cleaning
- c. Inspection
- d. Removal
- e. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

Hard Wooden Blocks (2), 6 by 6 by 18 inches

MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

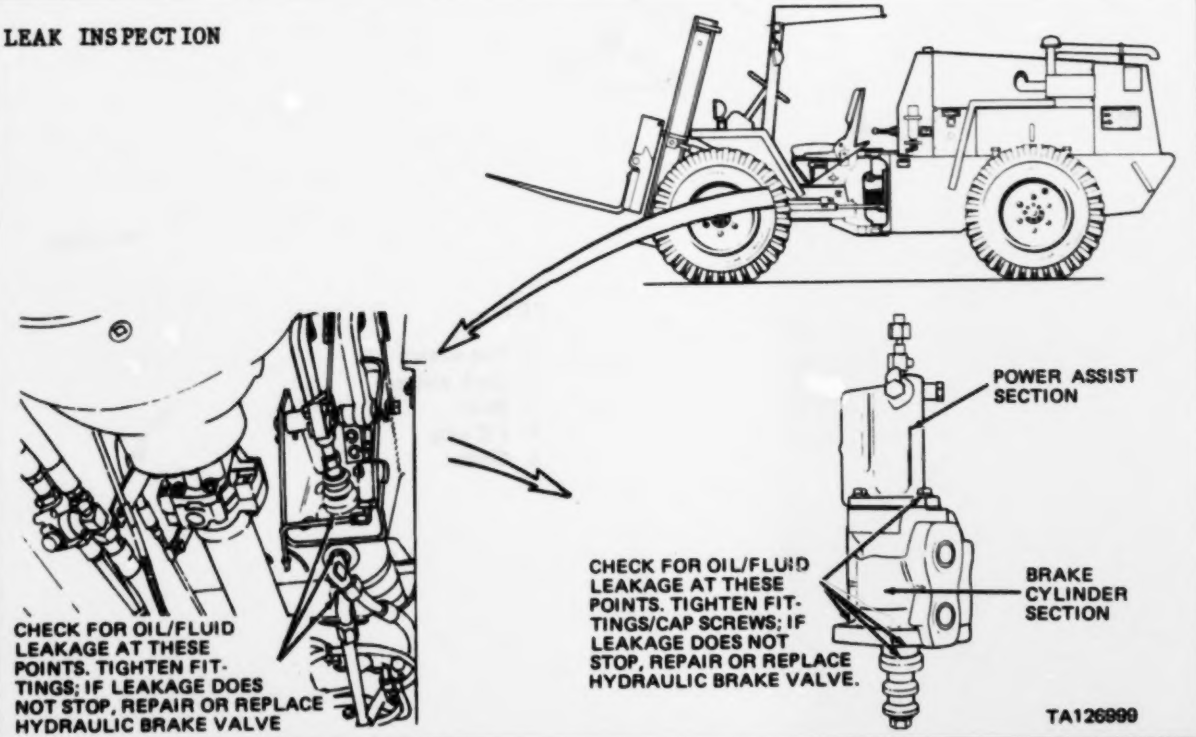
Brake fluid, silicone (MIL-B-46176)

Grease (MIL-G-10924)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	Vehicle parked on level surface, wheels blocked, parking brake applied.
2-31e(2)	Stop light switch removed.
2-43b	Brake hoses, lines and fittings disconnected from hydraulic brake valve.
2-53i	Chassis guard removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
LEAK INSPECTION				



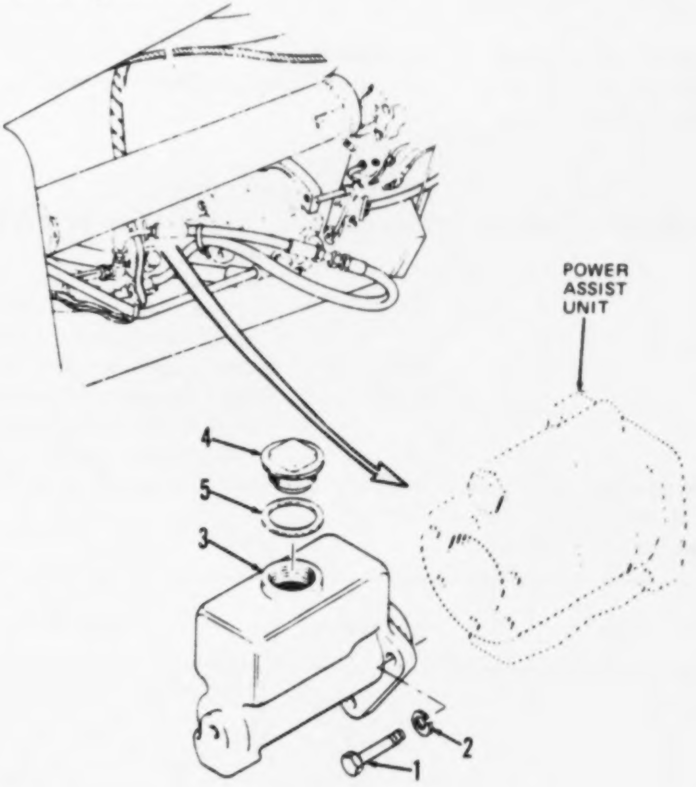
CHECK FOR OIL/FLUID LEAKAGE AT THESE POINTS. TIGHTEN FITTINGS; IF LEAKAGE DOES NOT STOP, REPAIR OR REPLACE HYDRAULIC BRAKE VALVE

CHECK FOR OIL/FLUID LEAKAGE AT THESE POINTS. TIGHTEN FITTINGS/CAP SCREWS; IF LEAKAGE DOES NOT STOP, REPAIR OR REPLACE HYDRAULIC BRAKE VALVE.

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. Hydraulic Brake Valve (cont).

(1) Brake Master Cylinder (cont).


POWER
ASSIST
UNIT
4
5
3
2
1

TA127000

KEY

1. Cap screws
2. Lock washers
3. Body
4. Fill plug
5. Gasket

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. Hydraulic Brake Valve (cont).

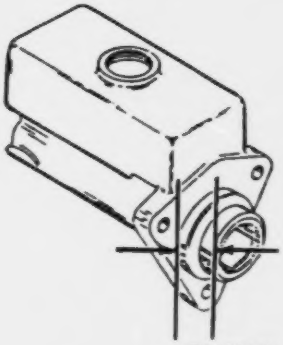
(1) Brake Master Cylinder (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
1		Master cylinder External only	Clean	Use cleaning solvent and dry with clean cloth
INSPECTION				
2		Cap screw (1), lock washer (2) and fill plug (4)	Inspect	Replace if worn, or if threads damaged
3		Body (3)	Inspect	Replace master cylinder assembly if cracked, threads damaged,
REMOVAL				
4	Front chassis, bottom left side	a. Three cap screws (1) and lock washers (2)	Loosen and remove	Support master cylinder body (3)
		b. Brake master cylinder body (3)	Pull and remove	From power assist unit

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(1) Brake Master Cylinder (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
5	Front chassis, bottom left side	a. Mating surface on body (3)	Lubricate	Lightly coat exterior area shown with grease
		 TA127004		
		b. Brake master cylinder (3)	Position	Against power assist unit, with fill plug opening facing upward
		c. Lock washers (2) and cap screws (1)	Install and tighten	Until brake master cylinder is securely mounted
		d. Brake hoses, lines and fittings	Connect to hydraulic brake valve and tighten	Para 2-43b
		e. Stop light switch	Install on hydraulic brake valve	Para 2-31e(2)
		f. Brake master cylinder (3)	Fill	Add clean brake fluid to within 1/2 inch of fill opening
		g. Brake lines	Bleed	Para 2-43a
		h. Brake pedal	Depress	With engine running. Check for proper brake operation

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(1) Brake Master Cylinder (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
9 (cont)		e. Stop light switch	Install on hydraulic brake valve	Para 2-31e(2)
		f. Brake master cylinder (3)	Fill	Add clean brake fluid to within 1/2 inch of fill opening
		g. Brake lines	Bleed	Para 2-43a
		h. Brake pedal	Depress	With engine running. Check for proper brake operation

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly/Repair
- f. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Hard Wooden Blocks (2), 6 by 6 by 18 inches	

MATERIALS/PARTS
- Cleaning solvent P-D-680
- Clean cloths
- Power assist unit repair kit

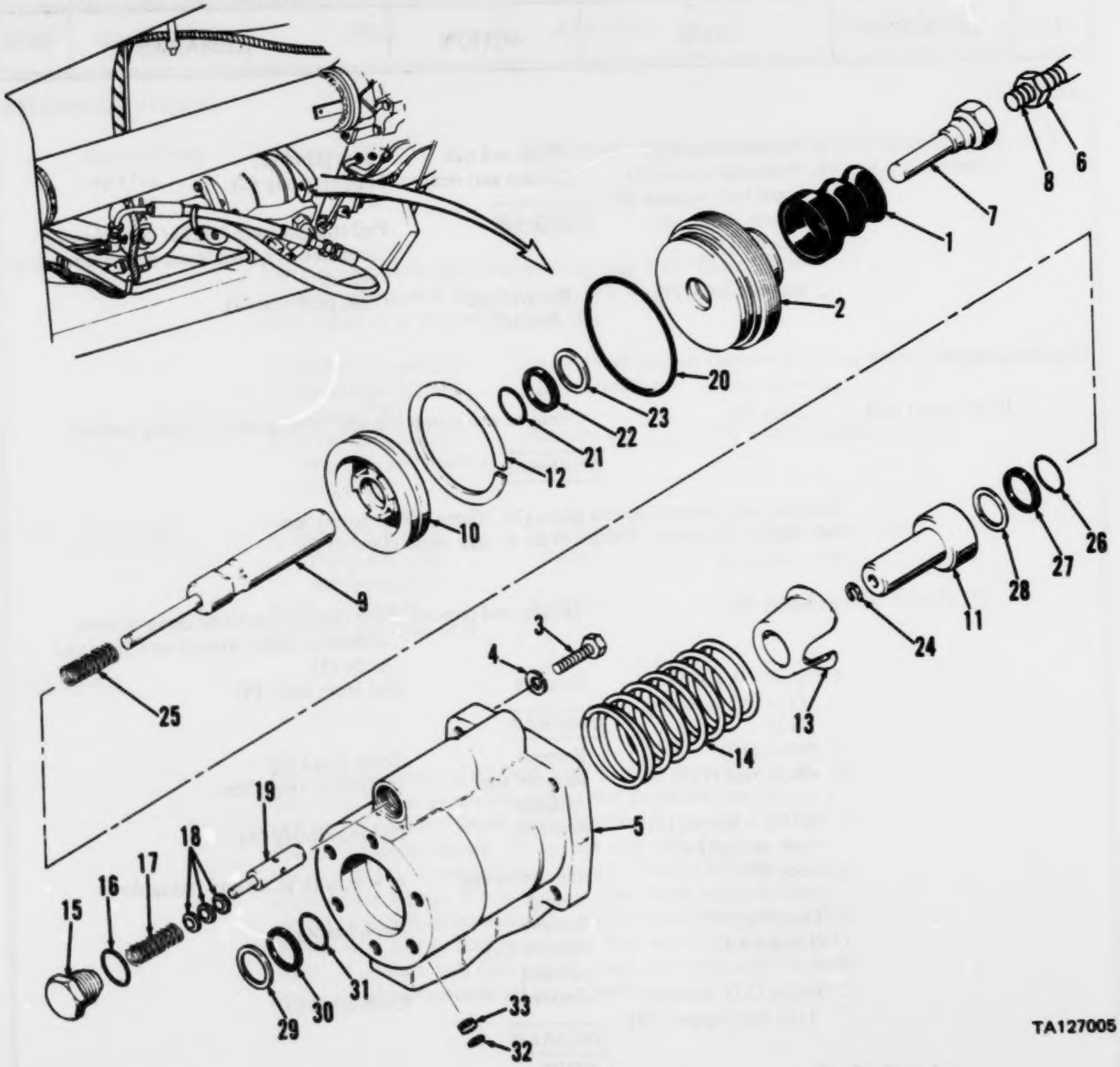
EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	Vehicle parked on level surface, wheels blocked, and parking brake applied.
2-43c(1)	Brake master cylinder removed.
2-48b(2)	Hydraulic lines and fittings disconnected from power assist unit.
2-43e	Brake pedal and declutch pedal removed.

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit (cont).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TA127005

1. Rubber cover
2. Gland
3. Cap screws
4. Lock washers
5. Body
6. Lock nut
7. Push rod
8. Brake pedal yoke
9. Spool
10. Piston
11. Spool cap
12. Piston ring
13. Spring retainer
14. Spring
15. End plug
16. O-ring
17. Spring
18. Shim(s)
19. Poppet
20. O-ring
21. O-ring
22. U-cup seal
23. Backup ring
24. Retaining ring
25. Spring
26. O-ring
27. U-cup seal
28. Backup ring
29. Backup ring
30. U-cup seal
31. O-ring
32. Retaining ring
33. Breather filter

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis, bottom left side	a. Rubber cover (1)	Grasp and pull	From gland (2)
		b. Four cap screws (3) and lock washers (4)	Loosen and remove	Support body (5)
		c. Power assist unit body (5)	Remove	Pull straight from bracket until clear of push rod (7); then lower and remove from vehicle
		d. Rubber cover (1)	Remove and discard	From push rod (7)
DISASSEMBLY				
2	Power assist unit	a. Body (5)	Position and clamp	In vise, with gland (2) facing upward
		WARNING Exercise care when removing gland (2). There will be spring tension against the gland. Failure to do so may cause gland to fly into your eyes.		
		b. Gland (2)	Loosen and remove	Turn counterclockwise using spanner wrench or chain wrench and pull from body (5)
		c. Spool (9), piston (10) and spool cap (11)	Remove	Pull from body (5)
		d. Piston (10)	Remove	From spool (9)
		e. Piston ring (12)	Remove and discard	Use piston ring pliers
		f. Spring retainer (13) and spring (14)	Remove	Pull from body (5)
		g. Body (5)	Reposition and clamp	In vise, with gland end facing down
		h. End plug (15)	Remove	From body (5)
		i. O-ring (16)	Remove and discard	
		j. Spring (17), shim(s) (18) and poppet (19)	Remove	From body (5)
		NOTE Spring (17) and shim(s) (18) are matched set. Retain shim(s) for reassembly with original spring (17).		
3	Gland (2)	a. O-ring (20)	Remove and discard	From gland (2)
		b. O-ring (21), U-cup seal (22) and backup ring (23)	Remove and discard	From bore in gland (2)

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. Hydraulic Brake Valve (cont).

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
4	Spool (9) and cap (11)	a. Spool (9)	Position and clamp	In soft-jawed vise, with retaining ring (24) facing upward

WARNING

Exercise care when removing retaining ring (24). There will be spring tension against the spool cap (11). Failure to do so may cause injury to your eyes by spool cap.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Retaining ring (24)	Expand and remove	Use retaining ring pliers. Discard ring (24)
		c. Spool cap (11) and spring (25)	Lift and remove	From spool (9)
		d. O-ring (26), U-cup seal (27) and backup ring (28)	Remove and discard	From bore in spool cap (11)
5	Body (5)	a. Backup ring (29), U-cup seal (30) and O-ring (31)	Remove and discard	From bore in body (5)
		b. Retaining ring (32) and filter (33)	Remove	From breather hole in body (5)

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
6		All parts	Clean	Use cleaning solvent P-D-680. Dry parts except breather filter (33), with compressed air
7		Internal metal parts	Flush	After cleaning, remove all traces of cleaning solvent by flushing with clean hydraulic oil
INSPECTION				
8		Springs (14 and 25)	Inspect	Replace if cracked, distorted or broken
9		Spring (17) and shim(s) (18)	Inspect	Replace power assist unit if cracked or damaged
10		Cap screws (3), lock washers (4), body (5), end plug (15) and gland (2)	Inspect	Replace if cracked, worn, or threads damaged, or body bore scored, pitted or burred
11		Push rod (7), spool (9), piston (10), spool cap (11) and poppet (19)	Inspect	Replace if cracked, scored, pitted or burred
REASSEMBLY/REPAIR				
12	Body (5)	a. Breather filter (33)	Install	In breather hole of body (5)
		b. Retaining ring (32)	Install	Push into breather hole until ring (32) is against shoulder of hole
		c. Body (5)	Lubricate	Lightly coat bore at rear of body with hydraulic oil
		d. O-ring (31)	Install	In seal (30)
		e. U-cup seal (30) and O-ring (31)	Install	In groove of bore at rear of body (5), with lips of seal (30) facing body
		f. Backup ring (29)	Install	Push against flat side of U-cup seal (30) in body bore
13	Spool (9) and cap (11)	a. O-ring (26)	Install	In U-cup seal (27)
		b. Spool cap (11)	Lubricate	Lightly coat open end of bore with hydraulic oil
		c. Backup ring (28)	Install	Push against flat side of seal (27) in spool cap bore

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY/REPAIR (cont)				
13 (cont)		d. U-cup seal (27) and O-ring (26)	Install	In groove of spool cap bore, with lips of seal (27) facing open end of bore
		e. Spool (9)	Position and clamp	In soft-jawed vise, with narrow end of spool facing up
		f. Spring (25)	Install	Slide over narrow end of spool (9)

CAUTION

Exercise care when installing spool cap (11) so as not to damage U-cup seal (27).

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Spool cap (11)	Install	Push wide end of spool cap (11) down over spool (9) and against pressure of spring (25)
		h. Retaining ring (24)	Install	Push into groove at end of spool cap, and close with pliers until ring is tight in groove
14	Gland (2)	a. O-ring (21)	Install	In U-cup seal (22)
		b. Gland (2)	Lubricate	Lightly coat bore with hydraulic oil
		c. Backup ring (23)	Install	Push against flat side of seal (22) in gland bore
		d. U-cup seal (22) and O-ring (21)	Install	In groove of gland bore, with lips of seal (22) toward inner face of gland
		e. O-ring (20)	Install	In groove at outside diameter of gland (2)
15	Power assist unit	a. Body (5)	Position and clamp	In vise, with gland end facing down
		b. Poppet (19)	Lubricate	Lightly coat with hydraulic oil

CAUTION

Exercise care so as not to scratch or damage poppet (19) during installation.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Poppet (19)	Install	In relief valve bore of body (5), with narrow end of poppet facing up. Be sure poppet goes all the way down to the seat

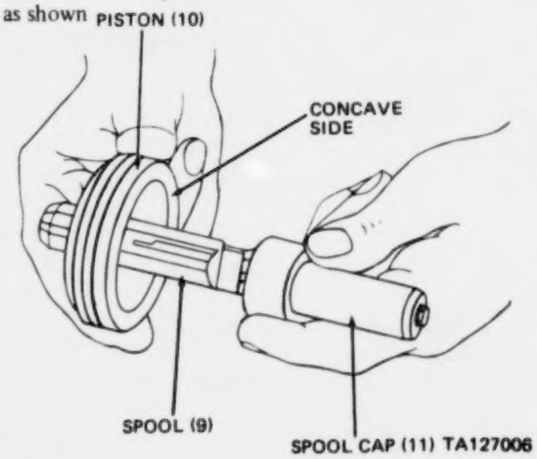
NOTE

Spring (17) and shim(s) (18) are matched for proper relief pressure. Reassemble power assist unit using original spring and shim(s) only.

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. Hydraulic Brake Valve (cont)

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY/REPAIR (cont)				
15 (cont)		d. Shim(s) (18)	Install	If used, slide over narrow end of poppet onto shoulder
		e. Spring (17)	Install	On poppet (19)
		f. O-ring (16)	Install	Over threaded end of plug (15)
		g. End plug (15)	Install and tighten	Push over spring (17) and turn clockwise until securely mounted to body (5)
		h. Body (5)	Reposition and clamp	In vise, with gland end facing up
		i. Spring (14) and retainer (13)	Install	In body bore
		j. Piston ring (12)	Install on piston (10)	Use piston ring pliers
		k. Spool (9)	Lubricate	Lightly coat piston end of spool with hydraulic oil
		l. Piston (10)	Install as shown	
		m. Piston (10) and piston ring (12)	Lubricate	Lightly coat outer surface with hydraulic oil
		n. Spool cap (11), spool (9) and piston (10)	Install	Position spool cap (11) into bore of body; then lower spool, cap and piston assembly onto spring (14)
		o. O-ring (20) and U-cup seals (22 and 30)	Lubricate	Lightly coat with hydraulic oil

CAUTION

Exercise care so as not to damage U-cup seals (22 and 30) when installing gland (2).

2-43. SERVICE BRAKE MAINTENANCE (cont)

c. *Hydraulic Brake Valve (cont).*

(2) Power Assist Unit (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY/REPAIR (cont)				
15 (cont)		p. Gland (2)	Install	Carefully push onto spool (9); then push gland down against pressure of spring (14) and screw several turns into body (5)
		q. Spool (9)	Push down	To verify that spool cap (11) moves smoothly through bore
		r. Gland (2)	Tighten	Use spanner wrench or chain wrench
		s. Rubber cover (1)	Install	Push large end of cover onto groove around outside of gland (2)
		t. Body (5)	Remove	From vise
INSTALLATION/REPLACEMENT				
16	Front chassis, bottom left side	a. Push rod (7)	Install	Screw clockwise onto yoke (8)
		b. Power assist unit	Position	Slide rubber cover (1) over push rod (7). Position bracket, with hydraulic ports in body facing down
		c. Four lock washers (4) and cap screws (3)	Install through bracket and tighten	Until power assist unit is securely mounted
		d. Hydraulic lines and fittings	Connect to ports on body (5) and tighten	Para 2-48b(2)
		e. Brake master cylinder	Install	Para 2-43c(1)
		f. Brake pedal	Adjust free travel	Para 2-43e
		g. Power assist unit	Test relief pressure	Para 2-41, MALFUNCTION 8, step 7
		h. Brake pedal	Depress	With engine running. Check for proper brake operation

2-43. SERVICE BRAKE MAINTENANCE (cont)

d. Declutch Valve.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly
- f. Installation
- g. Adjustment

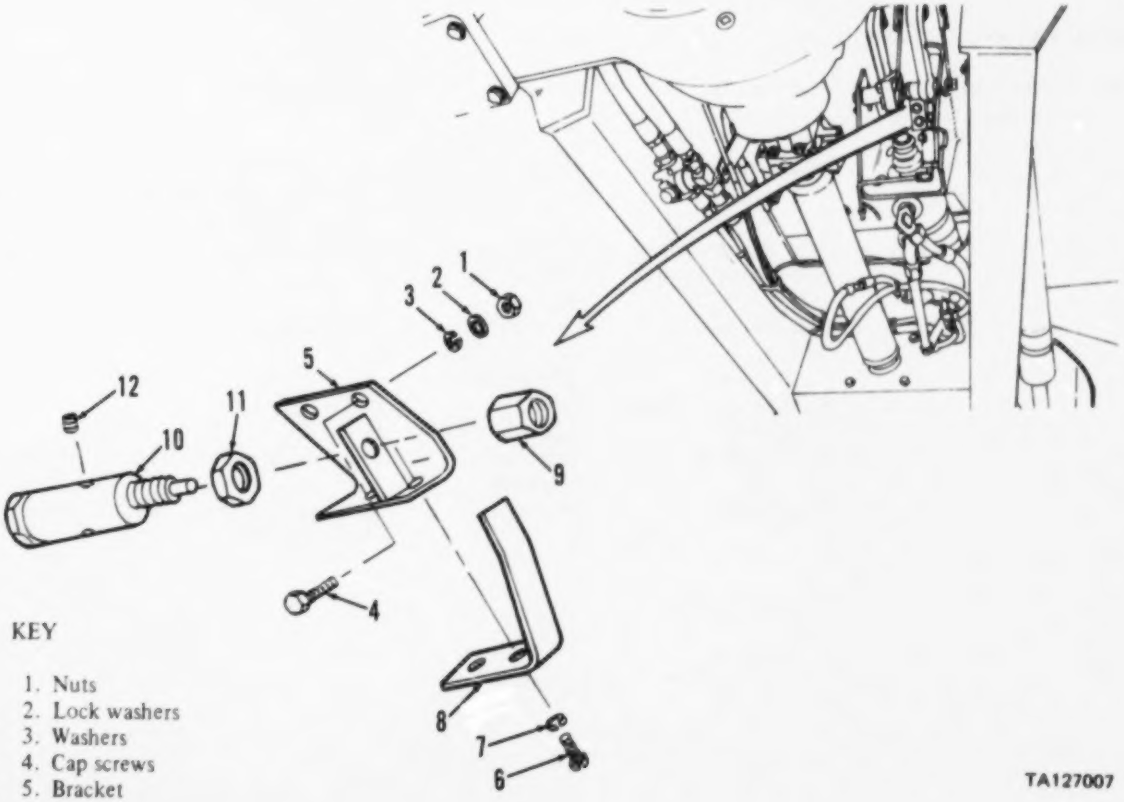
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	Vehicle parked on level surface, wheels blocked, and parking brake applied.
2-43b	Brake hoses, lines and fittings disconnected from declutch valve



KEY

1. Nuts
2. Lock washers
3. Washers
4. Cap screws
5. Bracket
6. Screws
7. Lock washers
8. Flat spring
9. Nut
10. Declutch valve
11. Lock nut
12. Pipe plug

2-43. SERVICE BRAKE MAINTENANCE (cont)

d. Declutch Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis, bottom left side	a. Two nuts (1), lock washers (2), flat washers (3) and cap screws (4)	Loosen and remove	Support bracket (5)
		b. Bracket (5) and valve (10)	Remove	Lower from pedal bracket
DISASSEMBLY				
2	Declutch valve (10)	a. Two screws (6) and lock washers (7)	Remove	From spring (8) and bracket (5)
		b. Flat spring (8)	Remove	From bracket (5)
		c. Nut (9)	Loosen and remove	From valve (10)
		d. Declutch valve (10)	Remove	From bracket (5)
		e. Lock nut (11) and pipe plug (12)	Loosen and remove	From valve (10)
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Declutch valve (10)	Clean	Wipe exterior and shaft with cloth moistened in cleaning solvent P-D-680

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air

2-43. SERVICE BRAKE MAINTENANCE (cont)

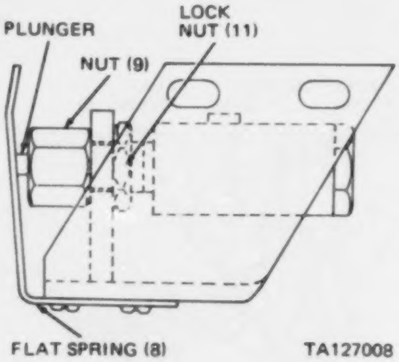
d. Declutch Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
5		Spring (8)	Inspect	Replace if cracked, distorted or damaged
6		All other parts	Inspect	Replace if cracked, worn, or threads damaged
REASSEMBLY				
7	Declutch valve (10)	**NOTE** Remove and discard bleeder valve and washer supplied with new declutch valve (10).		
		a. Pipe plug (12)	Install and tighten	Until securely mounted on valve (10)
		b. Lock nut (11)	Install	On shaft of valve (10)
		c. Declutch valve (10)	Position	On bracket (5)
		d. Nut (9)	Install	On shaft of valve (10). Do not tighten nuts (9 and 11) at this time.
		e. Flat spring (8)	Position	On bracket (5)
		f. Two lock washers (7) and screws (6)	Install and tighten	Until spring (8) is securely mounted
INSTALLATION				
8	Front chassis, bottom left	a. Bracket (5) and valve (10)	Position	On pedal bracket
		b. Two cap screws (4), washers (3), lock washers (2) and nuts (1)	Install	On pedal bracket and valve bracket (5). Do not tighten at this time
		c. Brake hoses, lines and fittings	Reconnect to valve (10) and tighten	Para 2-43b
		NOTE Be sure to bleed brake system (para 2-43a, step 16).		

2-43. SERVICE BRAKE MAINTENANCE (cont)

d. Declutch Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT				
9	Declutch valve (10)	a. Declutch valve (10)	Position	On bracket (5) so that valve plunger just makes contact with flat spring



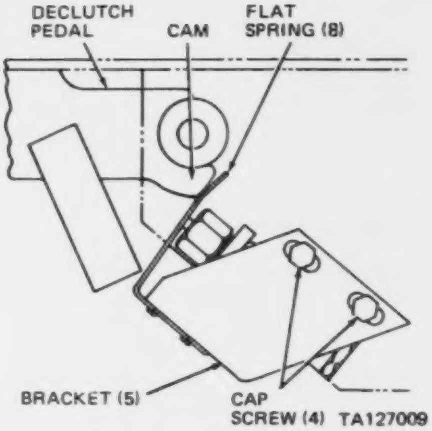
STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Nuts (9 and 11)	Tighten against bracket (5)	To secure adjustment
		c. Flat spring (8)	Gently pull from plunger and release	To check adjustment. When released, spring (8) should contact valve plunger without depressing plunger

NOTE

If necessary, repeat steps a and b above, and recheck adjustment (step c above) before proceeding.

2-43. SERVICE BRAKE MAINTENANCE (cont)

d. Declutch Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
10	Bracket (5)	a. Bracket (5)	Position	On pedal bracket, so that flat spring (8) just makes contact with cam on declutch pedal without depressing valve plunger
		 DECLUTCH PEDAL CAM FLAT SPRING (8) BRACKET (5) CAP SCREW (4) TA127009		
		b. Two cap screws (4)	Tighten	To secure adjustment

2-43. SERVICE BRAKE MAINTENANCE (cont)

e. Brake Pedal and Declutch Pedal.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly
- f. Installation
- g. Adjustment

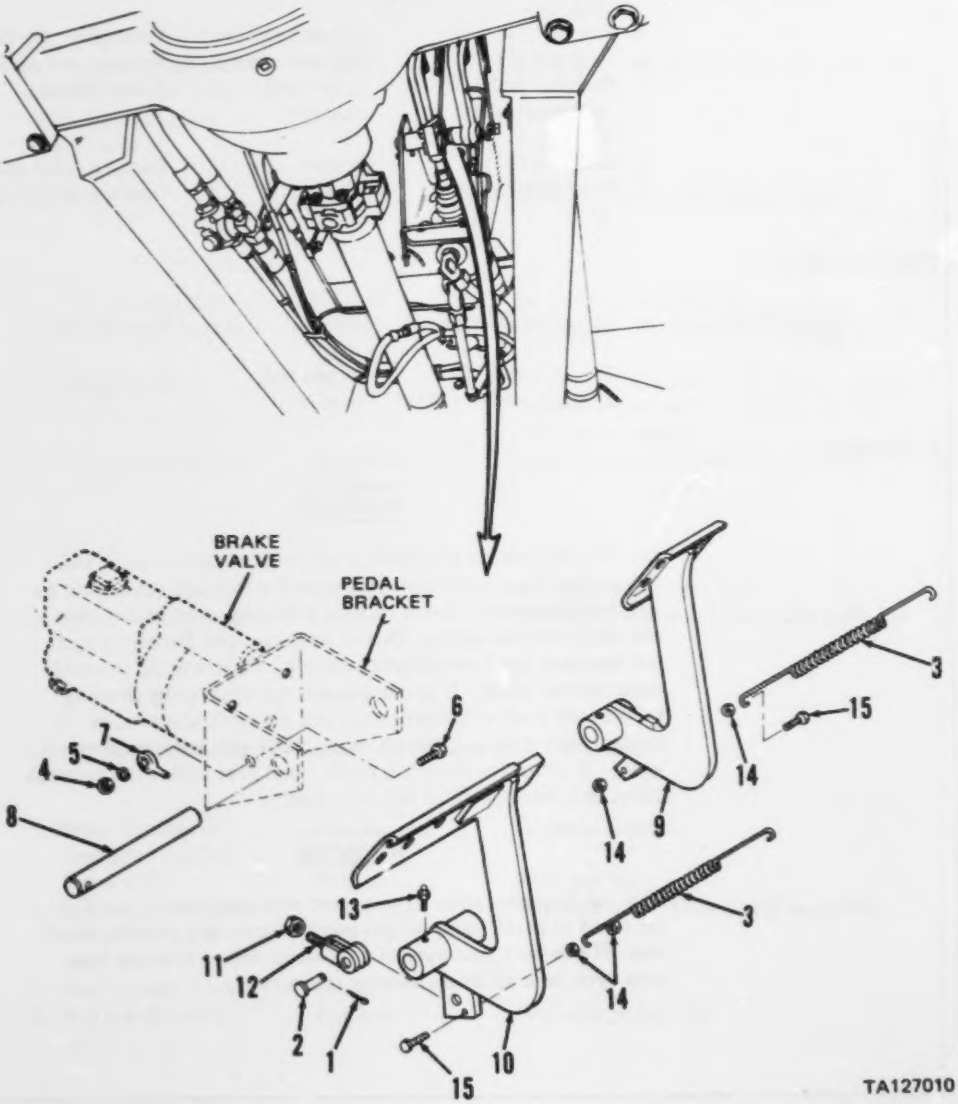
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hard Wooden Blocks (2), 6 by 6 by 18 inches

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Grease (MIL-G-10924)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
	Vehicle parked on level surface, wheels blocked, and parking brake applied.
2-53i	Chassis floor plate removed.



KEY

1. Cotter pin
2. Clevis pin
3. Return springs
4. Nut
5. Lock washer
6. Cap screw
7. Eye rod
8. Pivot pin
9. Declutch pedal
10. Brake pedal
11. Lock nut
12. Brake pedal yoke
13. Grease fittings
14. Lock nuts
15. Cap screws

TA127010

2-43. SERVICE BRAKE MAINTENANCE (cont)

e. Brake Pedal and Declutch Pedal (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis, bottom left side	a. Cotter pin (1) and clevis pin (2)	Remove	
		b. Two springs (3)	Unhook and remove	Use pliers
		c. Nut (4), lock washer (5) and cap screw (6)	Loosen and remove	Support eye rod (7)
		d. Eye rod (7)	Pull and remove	From pivot pin (8)
		e. Pivot pin (8)	Pull and remove	Support pedals (9 and 10)
		f. Declutch pedal (9) and brake pedal (10)	Lower and remove	From vehicle
		g. Lock nut (11)	Loosen	Unscrew from nut on brake valve push rod
		h. Brake pedal yoke (12)	Remove	Unscrew from brake valve push rod
DISASSEMBLY				
2	Pedals (9 and 10)	a. Two grease fittings (13)	Remove	From pedals
		b. Two lock nuts (14) and cap screws (15)	Loosen and remove	From pedals
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

2-43. SERVICE BRAKE MAINTENANCE (cont)

e. Brake Pedal and Declutch Pedal (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
4		Springs (3)	Inspect	Replace if cracked, distorted, or coil broken
5		Pivot pin (8), declutch pedal (9), brake pedal (10), yoke (12) and pins (1 and 2)	Inspect	Replace if worn, pitted, burred or damaged
6		All hardware	Inspect	Replace if worn, or if threads damaged
REASSEMBLY				
7	Pedals (9 and 10)	a. Cap screws (15)	Position	On pedal spring bracket.
		b. Two lock nuts (14)	Install and tighten	Until screw (15) is securely mounted
		c. Two lock nuts (14)	Install	On end of cap screw (15). Do not tighten against inside lock nut (14) or spring bracket on pedal
		d. Two grease fittings (13)	Install and tighten	Until fitting (13) is securely mounted
INSTALLATION				
8	Front chassis, bottom left side	a. Lock nut (11)	Install	On brake pedal yoke (12)
		b. Brake pedal yoke (12)	Install	Turn clockwise into brake valve push rod

NOTE

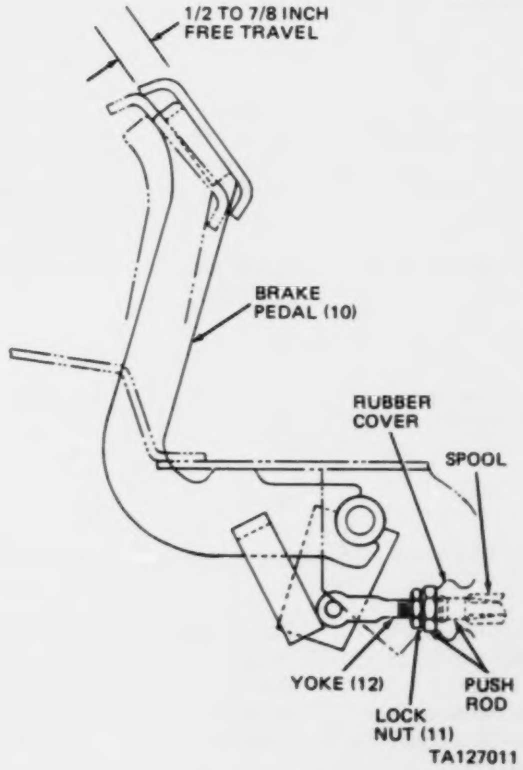
Do not tighten lock nut (11) against brake valve push rod at this time.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Pedals (9 and 10) and pivot pin (8)	Position and install	On pedal bracket
		d. Eye rod (7)	Push in	Pivot pin (8)
		e. Cap screw (6), lock washer (5) and nut (4)	Install and tighten	Until eye rod (7) is securely mounted
		f. Two springs (3)	Install	
		g. Brake pedal yoke (12)	Position	On brake pedal (10)

2-43. SERVICE BRAKE MAINTENANCE (cont)

e. Brake Pedal and Declutch Pedal (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
8 (cont)		h. Clevis pin (2) and cotter pin (1)	Install	On yoke (12) and brake pedal (10)
ADJUSTMENT				
9	Declutch valve	Declutch valve and bracket	Adjust	Para 2-43d
10	Brake pedal (10) and yoke (12)	a. Rubber cover	Remove	Pull cover from gland on hydraulic brake valve
		b. Push rod	Adjust	Turn push rod in or out until free travel of brake pedal is 1/2 to 7/8 inch as shown


1/2 TO 7/8 INCH FREE TRAVEL
BRAKE PEDAL (10)
RUBBER COVER
SPOOL
YOKE (12)
LOCK NUT (11)
PUSH ROD
TA127011

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Lock nut (11)	Tighten against push rod	To secure adjustment
		d. Rubber cover	Install	Push large end of cover over groove at brake unit gland

Section VIII. WHEELS AND STEERING MAINTENANCE

This section contains the information you'll need to maintain the:

- Wheels and tires
- Steering system

It gives you instructions on how to troubleshoot problems, and repair or replace the components that are within the scope of organizational maintenance.

	Para
Troubleshooting Symptom Index	2-44
Wheels and Tires Troubleshooting	2-45
Steering System Troubleshooting	2-46
Wheels and Tires Maintenance	2-47
Steering System Maintenance	2-48
Hydraulic Pump	2-48a
Hoses, Lines and Fittings	2-48b
Steering Cylinder Assembly	2-48c

2-44. TROUBLESHOOTING SYMPTOM INDEX

NOTE

A hydraulic system schematic is located at the back of this manual in appendix F.

	Para/Malfunction	Page
WHEELS AND TIRES		
Tires wearing unevenly	2-45/1	2-319
Noisy or bumping sound while traveling	2-45/2	2-320
STEERING SYSTEM		
Vehicle will not turn when steering wheel is turned	2-46/1	2-321
Vehicle turns correctly in one direction but not in other direction	2-46/2	2-322
Steering wheel turns hard or vehicle turns too slow	2-46/3	2-323
Effort to turn in one direction is more than required in other direction	2-46/4	2-324

2-45. WHEELS AND TIRES TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. TIRE WEARING UNEVENLY

Step 1. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b (1)) and install in chassis. Ensure that parking brake is in released position.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Rotate wheel by hand; there should be a very slight drag on wheel.
Repeat above for remaining wheel and axle.

2-45. WHEELS AND TIRES TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. TIRE WEARING UNEVENLY (cont)

Step 1. (cont)

a. If there is excessive drag on wheels, adjust brakes (para 2-43a).

b. If there is a very slight drag on wheels, proceed to step 2.

Step 2. With wheel off ground (step 1 above), check wheel bearing adjustment (use pry bar to check for any noticeable end play).

a. If there is any noticeable end play, adjust wheel bearing (para 2-39f).

b. If there is no noticeable end play, remove axle shaft (para 2-39f) and check that wheel bearing is lubricated. If wheel bearing is lubricated, check it for damage (para 2-39f); replace wheel bearing if necessary.

2. NOISY OR BUMPING SOUND WHILE TRAVELING

Step 1. Check wheel lug nuts for tightness (should be tightened to 240-260 pounds foot torque).

a. If lug nuts are loose, tighten to 240-260 pounds foot torque.

b. If lug nuts are tight, proceed to step 2.

Step 2. Place blocks (6 by 6 by 18 inches wood blocks) at each wheel to prevent vehicle from moving. Remove shipping lock pin from storage area under operator's seat (para 2-4b (1)) and install in chassis. Ensure that parking brake is in released position.

WARNING

Before raising axle off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Raise one axle and wheels off ground.
Rotate wheel by hand while listening for a rumbling or grinding sound within axle.
Repeat for other wheel and axle.

a. If rumbling or grinding sound is heard, replace axle shaft (para 2-39f).

b. If rumbling or grinding sound is not heard, proceed to step 3.

Step 3. With wheel off ground (step 2 above), check wheel bearing adjustment (use pry bar to check for any noticeable end play).

a. If there is noticeable end play, adjust wheel bearing (para 2-39f).

b. If there is no noticeable end play, proceed to step 4 below.

2-45. WHEELS AND TIRES TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. NOISY OR BUMPING SOUND WHILE TRAVELING (cont)

Step 4. Remove axle shaft (para 2-39f) and check wheel bearing for damage and insufficient lubricant (para 2-39f).

a. If insufficient lubricant, lubricate wheel bearing (para 2-39f); if wheel bearing is damaged, replace (para 2-39f).

b. If wheel bearing is okay, reinstall hub and drum assembly and axle shaft (para 2-39f), and remove wheels and tires (para 2-47). Disassemble tire from wheel and check for foreign material or damage (para 2-47); remove foreign material or replace tire if damaged (para 2-47).

2-46. STEERING SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. VEHICLE WILL NOT TURN WHEN STEERING WHEEL IS TURNED

Step 1. Check oil level in hydraulic reservoir.
Oil level should be between FULL and ADD marks with mast lowered.

a. If oil level is not between FULL and ADD marks on dipstick with mast lowered, add oil (refer to current lubrication order).

b. If oil level is okay, proceed to step 2 below.

Step 2. Check that steering bypass valve is closed (extreme clockwise position).

a. If steering bypass valve is not in closed position, turn to the extreme clockwise position.

b. If steering bypass valve is closed, proceed to step 3.

Step 3. Check for oil leaks at connections to steering cylinders.

a. If oil leaks are observed, tighten fittings or replace hoses (para 2-48b (1)).

b. If oil leaks are not observed, proceed to step 4.

Step 4. Start engine and operate at full throttle.
Operate lift control lever, tilt control lever, and shift control lever.
Check that mast assembly operates normally when levers are actuated.

a. If mast assembly does not operate normally, proceed to step 5.

b. If mast operates normally, replace steering gear (notify direct support maintenance).

2-46. STEERING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. VEHICLE WILL NOT TURN WHEN STEERING WHEEL IS TURNED (cont)

Step 5. Check setting of relief valve (para 2-48b (2), step 22).

a. If pressure indication is not 2500-2550 PSI, adjust relief valve (para 2-48b (2), step 23).

b. If pressure indication is 2500-2550 PSI, replace steering gear (notify direct support maintenance).

2. VEHICLE TURNS CORRECTLY IN ONE DIRECTION BUT NOT IN OTHER DIRECTION

Step 1. Check hoses, lines and fittings between steering gear and steering cylinders for oil leaks (para 2-48b).

a. If oil leaks are observed, tighten fittings or replace hoses (para 2-48b).

b. If oil leaks are not observed, proceed to step 2.

Step 2. Check steering cylinders for oil leaks at rod end.

a. If oil leaks are observed, replace steering cylinder.

b. If oil leaks are not observed, proceed to step 3.

Step 3. Check steering gear for oil leaks at fittings.

a. If oil leaks are observed, tighten fittings.

b. If oil leaks are not observed, proceed to step 4.

Step 4. Rotate steering wheel until vehicle is fully turned (articulated) to the left.
With engine off, loosen two clamps and slide cylinder guard toward front of vehicle, and disconnect hose from elbow as shown.

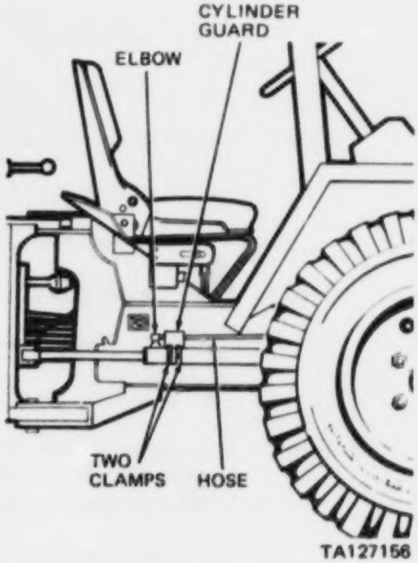
WARNING

Keep hands and feet clear of steering cylinder assembly while checking for leakage. Failure to do so may cause serious injury.

Start engine and hold steering wheel at the full left turn position.
Check for hydraulic oil leakage from the open steering cylinder elbow, then stop engine.

a. Hydraulic oil coming from open steering cylinder elbow indicates internal steering cylinder leakage. Replace steering cylinder assembly (para 2-48c).

b. If hydraulic oil does not leak from open steering cylinder elbow, reconnect hose to elbow, reinstall clamps and cylinder guard and proceed to step 5.

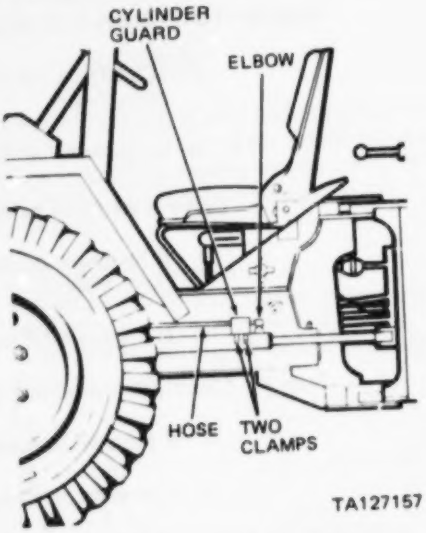


2-46. STEERING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. VEHICLE TURNS CORRECTLY IN ONE DIRECTION BUT NOT IN OTHER DIRECTION (cont)

Step 5. Rotate steering wheel until vehicle is fully turned (articulated) to the right.
With engine off, loosen two clamps and slide cylinder guard toward front of vehicle, and disconnect hose from elbow as shown.



WARNING

Keep hands and feet clear of steering cylinder assembly while checking for leakage. Failure to do so may cause serious injury.

Start engine and hold steering wheel at the full right turn position.
Check for hydraulic oil leakage from the open steering cylinder elbow, then stop engine.

a. Hydraulic oil coming from open steering cylinder indicates internal steering cylinder leakage. Replace steering cylinder assembly (para 2-48c).

b. If hydraulic oil does not leak from open steering cylinder elbow, replace steering gear (notify direct support maintenance).

3. STEERING WHEEL TURNS HARD OR VEHICLE TURNS TOO SLOW

Step 1. Check pressure in all tires (should be 45 PSI).

a. If tire pressure is not 45 PSI in all tires, adjust to 45 PSI.

b. If tire pressure is okay in all tires, proceed to step 2.

Step 2. Check oil level in hydraulic reservoir.
Oil level should be between FULL and ADD marks with mast lowered.

a. If oil level is not between FULL and ADD marks on dipstick with mast lowered, add oil (refer to current lubrication order).

b. If oil level is okay, proceed to step 3 below.

Step 3. Check steering cylinders for oil leaks at rod end.

a. If oil leaks are observed, replace steering cylinder.

b. If oil leaks are not observed, proceed to step 4.

2-46. STEERING SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. STEERING WHEEL TURNS HARD OR VEHICLE TURNS TOO SLOW (cont)

Step 4. Perform step 4 of paragraph 2-46, MALFUNCTION 2.

a. If hydraulic oil leaks from open steering cylinder elbow, replace steering cylinder assembly (para 2-48c).

b. If hydraulic oil does not leak from open steering cylinder elbow, proceed to step 5.

Step 5. Perform step 5 of paragraph 2-46, MALFUNCTION 2.

a. If hydraulic oil leaks from open steering cylinder elbow, replace steering cylinder assembly (para 2-48c).

b. If hydraulic oil does not leak from open steering cylinder elbow, proceed to step 6.

Step 6. Check pressure setting of relief valve (para 2-48b (2), step 22).

a. If pressure indication is not 2500-2550 PSI, adjust relief valve (para 2-48b (2), step 23).

b. If pressure indication is 2500-2550 PSI, replace steering gear (notify direct support maintenance).

4. EFFORT TO TURN IN ONE DIRECTION IS MORE THAN REQUIRED IN OTHER DIRECTION

Check steering gear for internal wear/damage (notify direct support maintenance).

Replace steering gear (notify direct support maintenance).

2-47. WHEELS AND TIRES MAINTENANCE

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly
- f. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hard Wooden Blocks (2), 6 by 6 by 18 inches

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

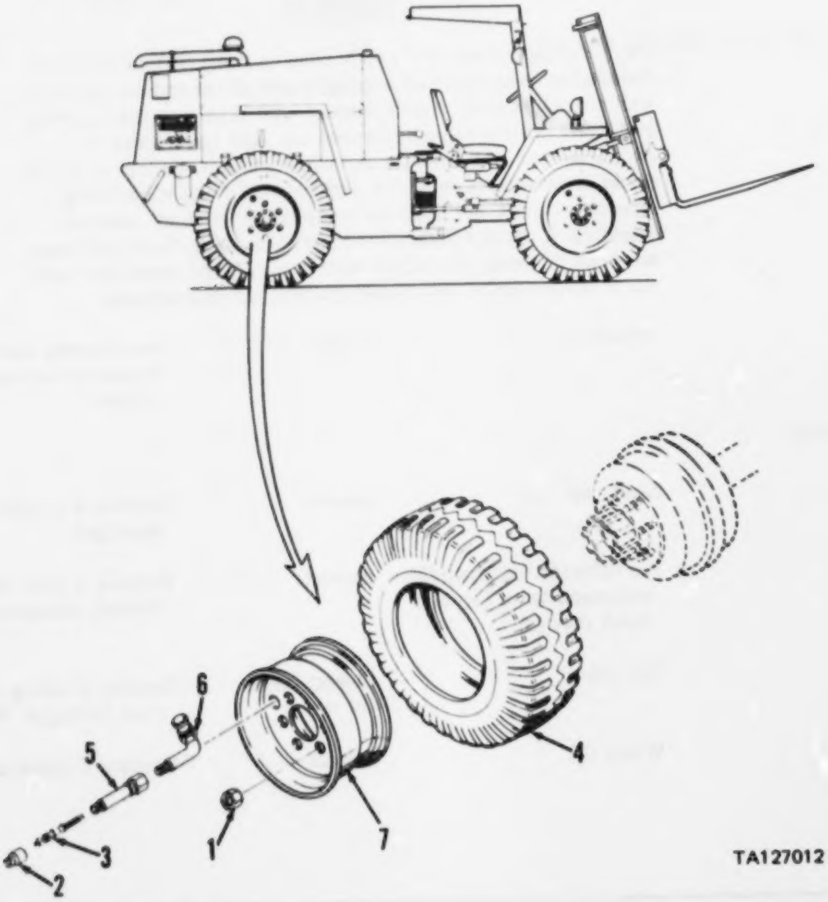
EQUIPMENT CONDITION

WARNING

Before raising wheel off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Paragraph	Condition Description
2-4b(1)	Shipping lock pin installed. Vehicle parked on level surface, engine off, parking brake applied, wheels not being removed blocked, and wheel and tire to be removed raised off ground.

KEY
1. Stud nuts
2. Valve cap
3. Valve core
4. Tire
5. Extension valve
6. Air valve
7. Wheel



2-47. WHEELS AND TIRES MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Tire and wheel to be removed	a. Six stud nuts (1)	Remove	
		b. Tire and wheel	Remove to work area	
DISASSEMBLY				
2		a. Valve cap (2)	Remove	
		b. Valve core (3)	Remove	To deflate tire
		c. Tire (4)	Deflate and remove	
		d. Extension valve (5)	Remove	
		e. Air valve (6)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Wheel (7)	Clean	Use cleaning solvent P-D-680; use wire brush to remove rust, corrosion or old rubber
INSPECTION				
4		Stud nuts (1)	Inspect	Replace if cracked, distorted, or threads damaged
5		Air valve (6), valve cap (2), extension valve (5), and valve core (3)	Inspect	Replace if bent, distorted, cracked, or threads damaged
6		Tire (4)	Inspect inside of tire	Replace if casing damaged or fabric and cord damaged. Remove foreign material
7		Wheel (7)	Inspect	Replace if cracked, bent, or damaged

2-47. WHEELS AND TIRES MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
8		a. Air valve (6)	Install in wheel (7)	
		b. Extension valve (5)	Install on air valve (6)	
		c. Valve core (3)	Install	
		WARNING Don't overinflate tire; serious injury or death could result.		
		d. Tire (4)	Install on wheel (7) and inflate	Inflate to 45 PSI
		e. Valve cap (2)	Install	
INSTALLATION/REPLACEMENT				
9		a. Tire and wheel	Position on axle end	
		b. Six stud nuts (1)	Install	Tighten to 240-260 pounds foot torque

2-48. STEERING SYSTEM MAINTENANCE

a. Hydraulic Pump.

This task covers:
a. Removal
b. Installation/Replacement

INITIAL SETUP

TOOLS

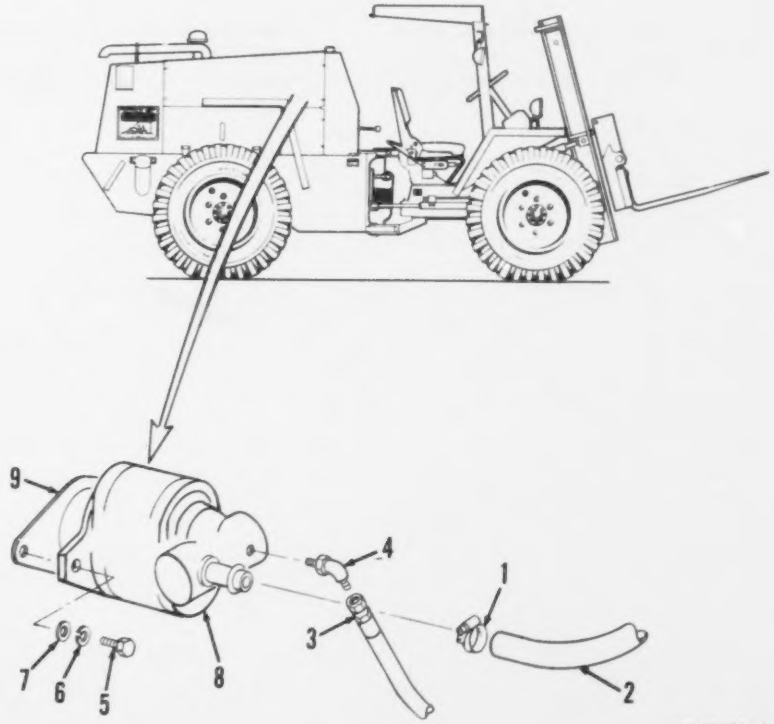
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-16	Exhaust pipe removed.
2-53d	Top hood removed.
2-53c	Right side panel removed.

KEY
1. Hose clamp
2. Suction hose
3. Supply hose fitting
4. Connector
5. Cap screws
6. Lock washers
7. Washers
8. Hydraulic pump
9. Gasket



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2-48. STEERING SYSTEM MAINTENANCE (cont)

a. Hydraulic Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
1	Engine compartment	a. Hydraulic pump (8) and hydraulic connections	Clean	Use cleaning solvent P-D-680
		b. Hose clamp (1)	Loosen	
		NOTE When disconnecting suction hose in following step, be ready to plug it immediately to prevent loss of oil.		
		c. Suction hose (2)	Disconnect and plug both hose and pump inlet	Prevents intrusion of dirt
		d. Supply hose fitting (3)	Disconnect and plug	Prevents intrusion of dirt
		e. Connector (4)	Remove and plug pump outlet	Prevent intrusion of dirt
		f. Two cap screws (5) and two lock washers (6) and washers (7)	Remove	Support hydraulic pump (8)
		g. Hydraulic pump (8)	Remove	
		h. Gasket (9)	Remove and discard	Clean all traces of gasket material from transmission mating surface
INSTALLATION/REPLACEMENT				
2	Engine compartment	a. Gasket (9)	Position on transmission	
		b. Hydraulic pump (8)	Position	
		c. Two washers (7), lock washers (6), and cap screws (5)	Install	
		d. Connector (4)	Install in pump outlet	

2-48. STEERING SYSTEM MAINTENANCE (cont)

a. Hydraulic Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
2 (cont)		e. Supply hose fitting (3)	Connect and tighten	
		f. Suction hose (2)	Connect to pump inlet	
		g. Hose clamp (1)	Position and tighten	
3	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate shift control lever to shift forks right and left several times c. Idle engine and check for oil leaks at hydraulic pump and connections d. Turn engine off	
4	Hydraulic reservoir	Oil level dipstick and fill	Check oil level; add oil if necessary	Refer to current lubrication order

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Adjustment

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Pressure Gage (3000 PSI maximum range)	

MATERIALS/PARTS

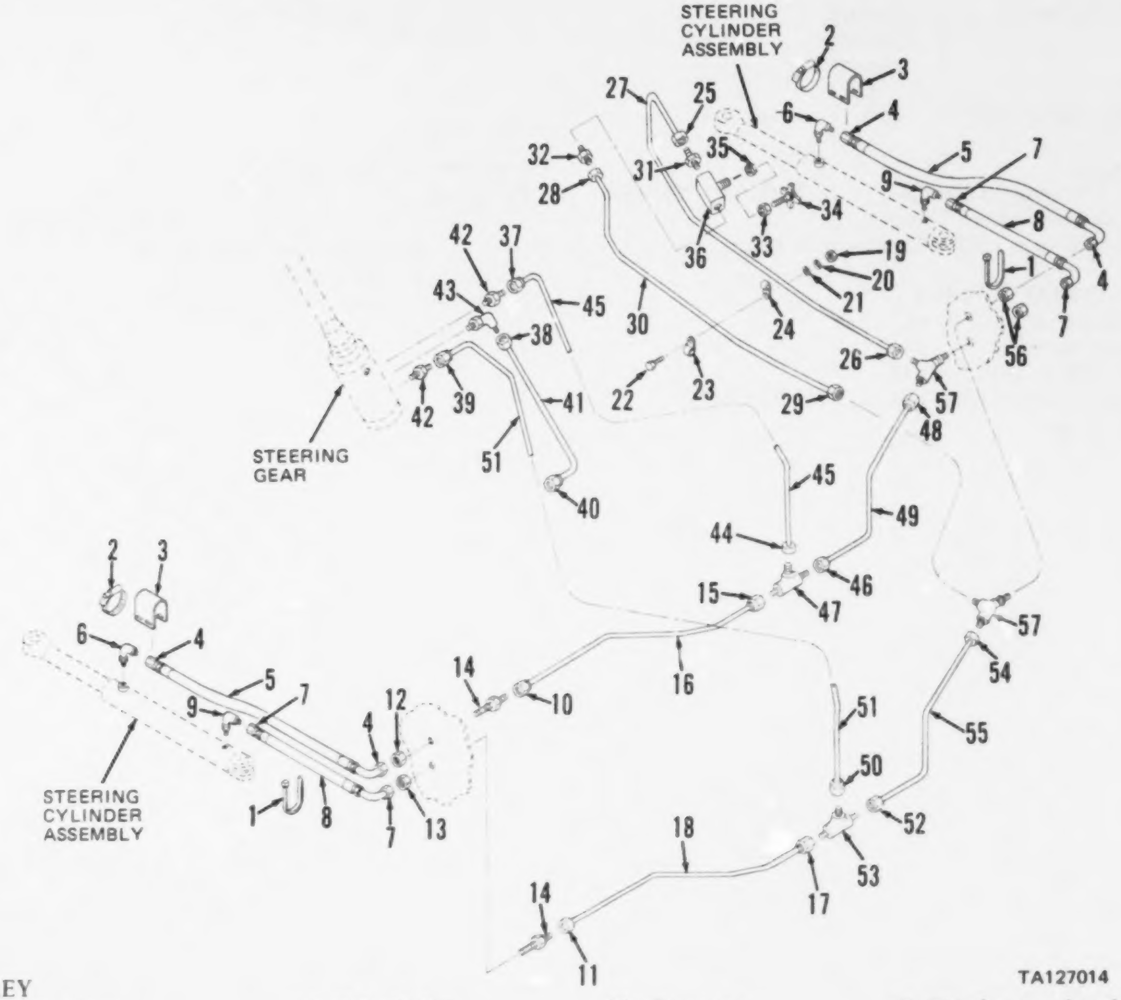
Cleaning solvent P-D-680
Clean cloths
Oil (MIL-L-2104, SAE 10)
Hose, 23 inches long (FSCM 24161 PIN 24 VW)
Tie straps (2)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Side panels removed.
2-53h	Noise baffle mat removed.

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).


STEERING CYLINDER ASSEMBLY
STEERING GEAR
STEERING CYLINDER ASSEMBLY
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TA127014

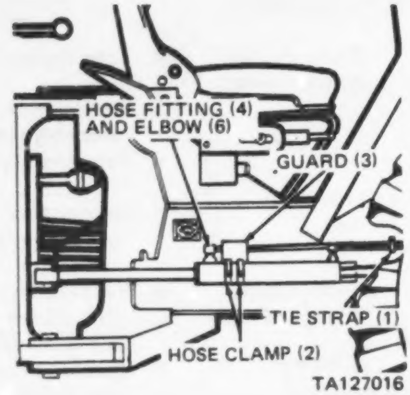
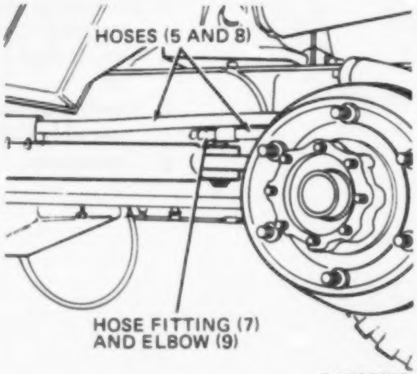
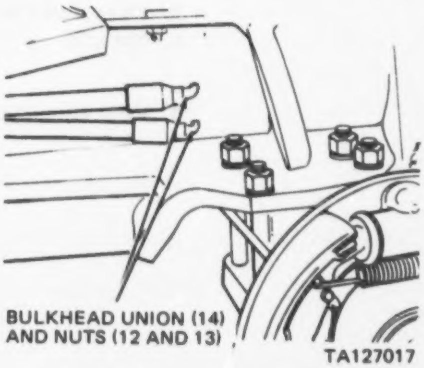
KEY

1. Tie straps
2. Hose clamps
3. Steering cylinder guards
4. Hose fittings
5. Steering supply hoses
6. Elbows
7. Hose fittings
8. Steering supply hoses
9. Elbows
10. Tube fitting
11. Tube fitting
12. Nut
13. Nut
14. Bulkhead unions
15. Tube fitting
16. Steering tube assembly
17. Tube fitting
18. Steering tube assembly
19. Nut
20. Lock washer
21. Washer
22. Cap screw
23. Clamp
24. Clamp
25. Tube fitting
26. Tube fitting
27. Steering bypass tube assembly
28. Tube fitting
29. Tube fitting
30. Steering bypass tube assembly
31. Connector
32. Connector
33. Stem nut
34. Valve stem
35. Nut
36. Valve body
37. Tube fitting
38. Tube fitting
39. Tube fitting
40. Tube fitting
41. Steering return tube assembly
42. Connectors
43. Adapter
44. Tube fitting
45. Steering supply tube assembly
46. Tube fitting
47. Steering tube tee
48. Tube fitting
49. Steering tube assembly
50. Tube fitting
51. Steering supply tube assembly
52. Tube fitting
53. Steering tube tee
54. Tube fitting
55. Steering tube assembly
56. Nuts
57. Bulkhead unions

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

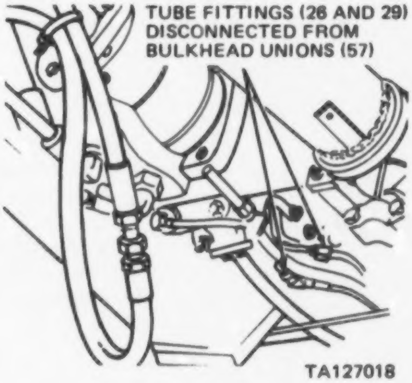
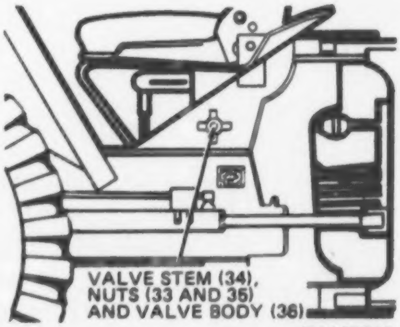
(1) Steering Gear to Steering Cylinder Assemblies.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis side	a. Two tie straps (1)	Remove	 HOSE FITTING (4) AND ELBOW (6) GUARD (3) TIE STRAP (1) HOSE CLAMP (2) TA127016
		b. Four hose clamps (2)	Remove	
		c. Two steering cylinder guards (3)	Remove	
		d. Two hose fittings (4)	Loosen and disconnect	
		e. Two steering supply hoses (5)	Remove	
		f. Two elbows (6)	Remove	 HOSES (5 AND 8) HOSE FITTING (7) AND ELBOW (9) TA127015
		g. Four hose fittings (7)	Loosen and disconnect	
		h. Two steering supply hoses (8)	Remove	
		i. Two elbows (9)	Remove	
2	Front chassis, bottom, right side	a. Tube fitting (10)	Loosen and disconnect	 BULKHEAD UNION (14) AND NUTS (12 AND 13) TA127017
		b. Tube fitting (11)	Loosen and disconnect	
3	Front chassis, right side	Nuts (12 and 13)	Remove	
4	Front chassis, bottom right side	Two bulkhead unions (14)	Remove	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

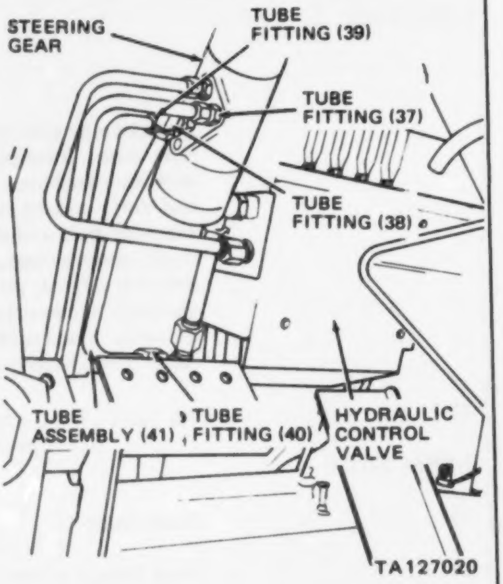
(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
5	Front chassis, bottom center	a. Tube fitting (15)	Loosen and disconnect	
		b. Steering tube assembly (16)	Remove	
		c. Tube fitting (17)	Loosen and disconnect	
		d. Steering tube assembly (18)	Remove	
6	Front chassis, bottom left side	a. Nut (19), lock washer (20), washer (21), and cap screw (22)	Remove	 TUBE FITTINGS (28 AND 29) DISCONNECTED FROM BULKHEAD UNIONS (57) TA127018
		b. Clamps (23 and 24)	Remove	
		c. Tube fittings (25 and 26)	Loosen and disconnect	
		d. Steering bypass tube assembly (27)	Remove	
		e. Tube fittings (28 and 29)	Loosen and disconnect	
		f. Steering bypass tube assembly (30)	Remove	
		g. Connectors (31 and 32)	Remove	
7	Steering bypass valve	a. Stem nut (33)	Loosen while opening valve	 VALVE STEM (34), NUTS (33 AND 35) AND VALVE BODY (36) TA127019
		b. Valve stem (34)	Remove	
		c. Nut (35)	Support valve body (36) and remove	
		d. Valve body (36)	Remove	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
8	Operator's compartment, steering gear	Tube fittings (37, 38, and 39)	Loosen and disconnect	 STEERING GEAR TUBE FITTING (39) TUBE FITTING (37) TUBE FITTING (38) TUBE ASSEMBLY (41) TUBE FITTING (40) HYDRAULIC CONTROL VALVE TA127020
9	Operator's compartment, near control valve	a. Tube fitting (40)	Loosen and disconnect	
		b. Steering return tube assembly (41)	Remove	
10	Operator's compartment, steering gear	a. Two connectors (42)	Remove	
		b. Adapter (43)	Remove	
11	Front chassis, bottom left side	a. Tube fitting (44)	Loosen and disconnect	
		b. Steering supply tube assembly (45)	Remove	
		c. Tube fitting (46)	Loosen and disconnect	
		d. Steering tube tee (47)	Remove	
		e. Tube fitting (48)	Loosen and disconnect	
		f. Steering tube assembly (49)	Remove	
		g. Tube fitting (50)	Loosen and disconnect	
		h. Steering supply tube assembly (51)	Remove	
		i. Tube fitting (52)	Loosen and disconnect	
		j. Steering tube tee (53)	Remove	
		k. Tube fitting (54)	Loosen and disconnect	
		l. Steering tube assembly (55)	Remove	
		m. Two nuts (56)	Remove	
		n. Two bulkhead unions (57)	Remove	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
12		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
13		Hose clamp (2)	Inspect	Replace if damaged
14		Hose fittings (4 and 7)	Inspect	Replace hose assembly (5 or 8) if damaged
15		Hoses (5 and 8)	Inspect	Replace if cracked, split, or fitting threads damaged
16		Elbow (6 and 9)	Inspect	Replace if cracked, distorted, or threads damaged
17		Tube fittings (10,11,15,17, 25,26,28,29,37 through 40,44,46,48,50,52, and 54)	Inspect	Replace tube assembly (16,18,27,30,41,45, 49, 51 or 55) if threads damaged
18		Bulkhead unions (14 and 57), connectors (31,32, 42), adapter (43), and steering tube tee (47)	Inspect	Replace if cracked, distorted, or threads damaged
19		Tube assemblies (16,18, 27,30,41,45,49,51, and 55)	Inspect	Replace if cracked, kinked, dented, twisted, or fitting threads damaged
20		Clamps (23 and 24)	Inspect	Replace if bent or cracked
21		Valve stem (34)	Inspect	Replace if bent, cracked, or twisted
22		Valve body (36)	Inspect	Replace if cracked or threads are damaged

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
23	Front chassis, bottom left side	a. Two bulkhead unions (57)	Position on chassis	
		b. Two nuts (56)	Install	
		c. Steering tube assembly (55)	Position	
		d. Tube fitting (54)	Connect to bulkhead union (57) and tighten	
		e. Steering tube tee (53)	Position on tube (55)	
		f. Tube fitting (52)	Connect to tee (53) and tighten	
		g. Steering supply tube assembly (51)	Position	
		h. Tube fitting (50)	Connect to tee (53) and tighten	
		i. Steering tube assembly (49)	Position	
		j. Tube fitting (48)	Connect to bottom union (57) and tighten	
		k. Steering tube tee (47)	Position	
		l. Tube fitting (46)	Connect to tee (47) and tighten	
		m. Steering supply tube assembly (45)	Position	
		n. Tube fitting (44)	Connect to tee (47) and tighten	
24	Operator's compartment, steering gear	a. Adapter (43)	Install	
		b. Two connectors (42)	Install	
25	Operator's compartment, near control valve	a. Steering return tube assembly (41)	Position	
		b. Tube fitting (40)	Connect to tee and tighten	
26	Operator's compartment, steering gear	a. Tube fitting (37)	Connect to top connector (42) and tighten	
		b. Tube fitting (38)	Connect to adapter (43) and tighten	
		c. Tube fitting (39)	Connect to bottom connector (42) and tighten	

2-48 STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
27	Operator's compartment, just beneath seat	a. Valve body (36)	Position	
		b. Nut (35)	Install on valve body and tighten	
		c. Valve stem (34)	Install in body (36)	
		d. Stem nut (33)	Tighten while closing valve (34)	
28	Front chassis, bottom left side	a. Connectors (31 and 32)	Install in valve body (36)	
		b. Steering bypass tube assembly (30)	Position	
		c. Tube fitting (29)	Connect to top bulkhead union (57) and tighten	
		d. Tube fitting (28)	Connect to connector (32) and tighten	
		e. Steering bypass tube assembly (27)	Position	
		f. Tube fitting (25)	Connect to connector (31) and tighten	
		g. Tube fitting (26)	Connect to bottom bulkhead union (57) and tighten	
		h. Clamps (23 and 24)	Position	
		i. Cap screw (22)	Install	
		j. Washer (21) lock washer (20), and nut (19)	Install	
29	Front chassis, bottom center	a. Steering tube assembly (18)	Position	
		b. Tube fitting (17)	Connect to tee (53) and tighten	
		c. Steering tube assembly (16)	Position	
		d. Tube fitting (15)	Connect to tee (47) and tighten	
30	Front chassis, bottom right side	a. Two bulkhead unions (14)	Position on side of chassis	
		b. Nuts (12 and 13)	Install	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

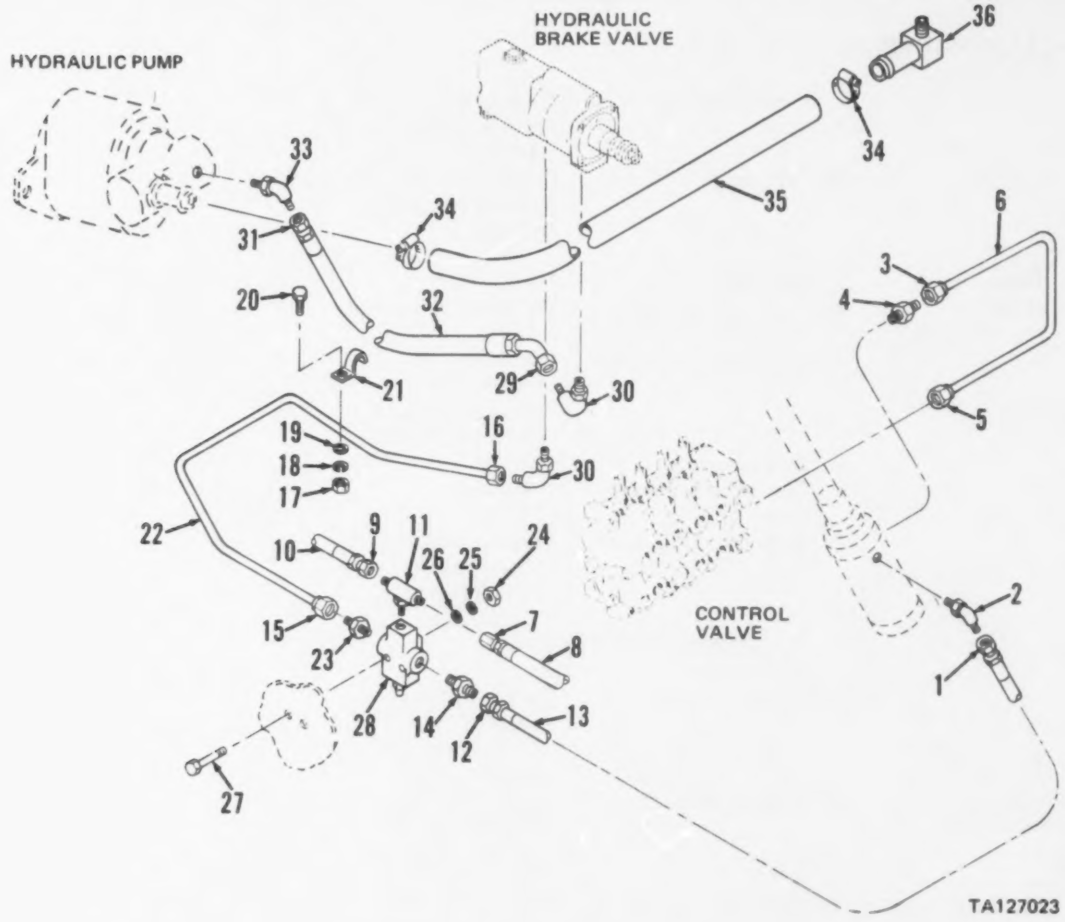
(1) Steering Gear to Steering Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
30 (cont)		c. Tube fitting (11)	Connect to bottom union (14) and tighten	
		d. Tube fitting (10)	Connect to top union (14) and tighten	
31	Front chassis, sides	a. Two elbows (9)	Install	
		b. Two steering supply hoses (8)	Position	
		c. Four hose fittings (7)	Connect to bottom union (14 and 57) and elbow (9); tighten	
		d. Two elbows (6)	Install	
		e. Two steering supply hoses (5)	Position	
		f. Four hose fittings (4)	Connect to elbow (6) and top union (14 and 57); tighten	
		g. Two steering cylinder guards (3)	Position	
		h. Four hose clamps (2)	Thread through guard (3) and around cylinder; tighten	
		i. Two tie straps (1)	Install around hoses (5 and 8) and tie	
32	Hydraulic reservoir	Oil level dipstick and fill	Check level and add if necessary	
33	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate shift control lever to shift forks right and left several times c. Operate engine at idle speed and check for oil leaks at connections d. Turn engine off e. Check hydraulic reservoir oil level (step 32)	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear.


HYDRAULIC PUMP
HYDRAULIC BRAKE VALVE
CONTROL VALVE
36
34
33
35
34
6
31
3
4
20
32
29
30
21
5
16
19
18
30
17
22
9
11
24
10
26
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15
7
23
8
2
28
14
13
1
12
27
TA127023

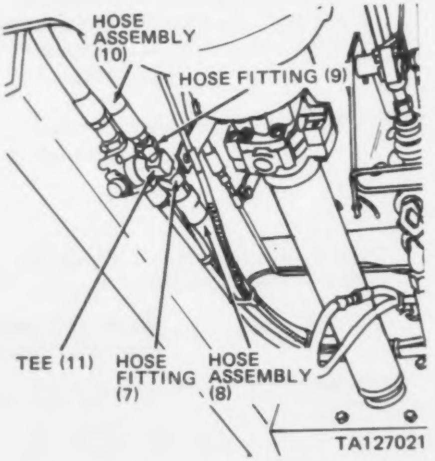
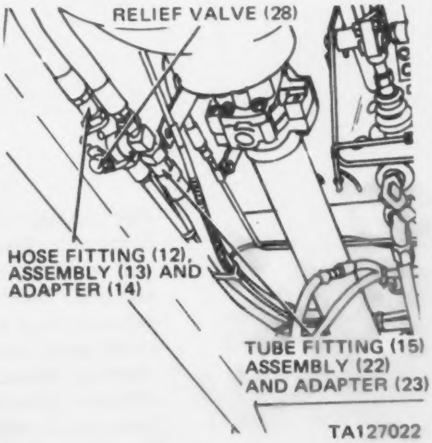
KEY

1. Hose fitting
2. Adapter
3. Tube fitting
4. Connector
5. Tube fitting
6. Tube assembly
7. Hose fitting
8. Hose assembly
9. Hose fitting
10. Hose assembly
11. Tee
12. Hose fitting
13. Hose assembly
14. Adapter
15. Tube fitting
16. Tube fitting
17. Nut
18. Lock washer
19. Washer
20. Cap screw
21. Clamp
22. Tube assembly
23. Adapter
24. Nuts
25. Lock washers
26. Washers
27. Cap screws
28. Relief valve
29. Hose fitting
30. Elbow
31. Hose fitting
32. Hose assembly
33. Connector
34. Hose clamps
35. Hose
36. Elbow

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

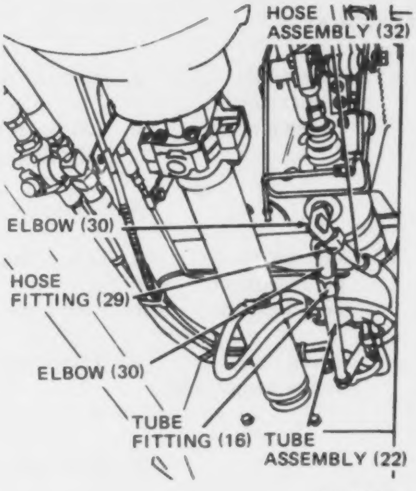
(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, steering gear	a. Hose fitting (1)	Loosen and disconnect	
		b. Adapter (2)	Remove	
		c. Tube fitting (3)	Loosen and disconnect	
		d. Connector (4)	Remove	
2	Operator's compartment, control valve	a. Tube fitting (5)	Loosen and disconnect	
		b. Tube assembly (6)	Remove	
3	Front chassis, bottom right side	a. Hose fitting (7)	Loosen, disconnect and cap; reposition hose assembly (8)	 HOSE ASSEMBLY (10) HOSE FITTING (9) TEE (11) HOSE FITTING (7) HOSE ASSEMBLY (8) TA127021
		b. Hose fitting (9)	Loosen, disconnect and cap; reposition hose assembly (10)	
		c. Tee (11)	Remove	
		d. Hose fitting (12)	Loosen and disconnect	 RELIEF VALVE (28) HOSE FITTING (12), ASSEMBLY (13) AND ADAPTER (14) TUBE FITTING (15) ASSEMBLY (22) AND ADAPTER (23) TA127022
		e. Hose assembly (13)	Remove	
		f. Adapter (14)	Remove	
		g. Tube fittings (15 and 16)	Loosen and disconnect	
		h. Nut (17), lock washer (18), washer (19), and cap screw (20)	Remove	
		i. Clamp (21)	Remove	
		j. Tube assembly (22)	Remove	
		k. Adapter (23)	Remove	

2-48. STEERING SYSTEM MAINTENANCE (cont)

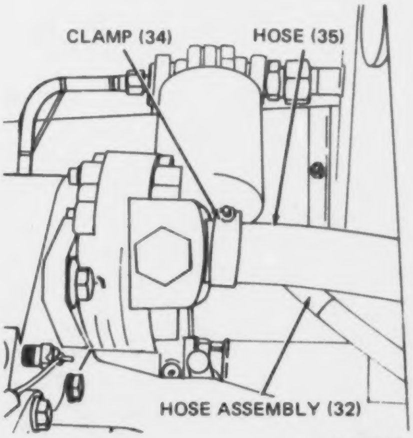
b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3 (cont)		l. Two nuts (24), lock washers (25), washers (26), and cap screws (27)	Remove	 HOSE ASSEMBLY (32) ELBOW (30) HOSE FITTING (29) ELBOW (30) TUBE FITTING (16) TUBE ASSEMBLY (22) TA127024
		m. Relief valve (28)	Remove	
		n. Hose fitting (29)	Loosen and disconnect	
		o. Elbow (30)	Remove	
4	Engine compartment, hydraulic pump	a. Hose fitting (31)	Loosen and disconnect	
		b. Hose assembly (32)	Remove	
		c. Connector (33)	Remove	

NOTE

If hose (35) requires replacement, drain hydraulic reservoir before removing hose.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Two hose clamps (34)	Loosen	 TA127025
		e. Hose (35)	Remove	
		f. Elbow (36)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
5		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
6		Hose fittings (1,7,9,12,29, and 31)	Inspect	Replace hose assembly (8,10,13 or 31) if damaged
7		Tube fittings (3,5,15 and 16)	Inspect	Replace tube assembly (6 and 22) if damaged
8		Hose assemblies (8,10,13 and 32) and hose (35)	Inspect	Replace if cracked, split, or fitting threads damaged. If necessary, make hose (35) from FSCM 24161 PIN 24VW; cut to 23 inches long
9		Adapters (2,14, and 23) connectors (4 and 33), tee (11), and elbows (30 and 36)	Inspect	Replace if cracked, distorted, or threads damaged
10		Tube assemblies (6 and 22)	Inspect	Replace if cracked, kinked, dented, twisted, or fitting threads damaged
11		Clamp (21)	Inspect	Replace if bent or cracked
12		Relief valve (28)	Inspect	Replace if cracked or threads damaged
13		Hose clamps (34)	Inspect	Replace if damaged
INSTALLATION/REPLACEMENT				
14	Engine compartment	a. Elbow (36)	Install in hydraulic reservoir	
		b. Two hose clamps (34)	Position on both ends of hose (35)	
		c. Hose (35)	Install	
		d. Hose clamps (34)	Tighten both	
		e. Connector (33)	Install in hydraulic pump	
		f. Hose assembly (32)	Position	
		g. Hose fitting (31)	Connect and tighten	
15	Front chassis, bottom right side	a. Elbow (30)	Install in brake valve ports	

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

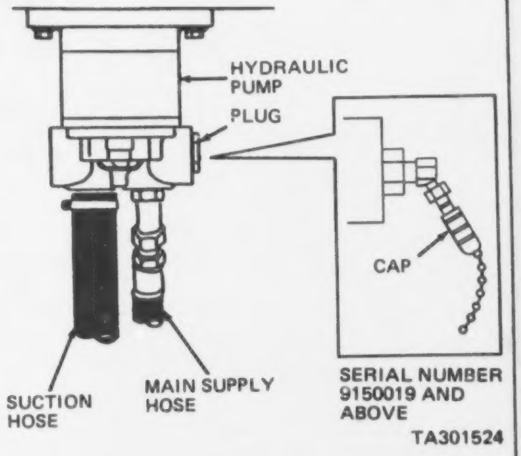
STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
15 (cont)		b. Hose fitting (29)	Connect and tighten	
		c. Relief valve (28)	Position on chassis	
		d. Two cap screws (27)	Install	
		e. Two washers (26), lock washers (25), and nuts (24)	Install	
		f. Adapter (23)	Install	
		g. Tube assembly (22)	Position	
		h. Clamp (21)	Position on tube assembly (22)	
		i. Cap screw (20)	Install	
		j. Washer (19), lock washer (18), and nut (17)	Install	
		k. Tube fitting (16)	Connect to elbow (30) and tighten	
		l. Tube fitting (15)	Connect to adapter (23) and tighten	
		m. Adapter (14)	Install in relief valve (28)	
		n. Hose assembly (13)	Position	
		o. Hose fitting (12)	Connect and tighten	
		p. Tee (11)	Install	
		q. Hose fitting (7)	Connect and tighten	
		r. Hose fitting (9)	Connect and tighten	
16	Operator's compartment, control valve	a. Tube assembly (6)	Position	
		b. Tube fitting (5)	Connect and tighten	
17	Operator's compartment, steering gear	a. Adapter (4)	Install	
		b. Tube fitting (3)	Connect and tighten	
		c. Adapter (2)	Install	
		d. Tube fitting (1)	Connect	
18	Hydraulic reservoir	Oil level dipstick and fill	Fill with oil	Para 2-56g(1)

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
19	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate shift control lever to shift forks right and left several times c. Operate engine at idle speed and check for oil leaks at connections d. Turn engine off e. Check hydraulic reservoir oil level (step 18)	
ADJUSTMENT				
20	Operator's compartment	Control valve	Operate all control levers several times with engine off	Relieves hydraulic pressure
21	Engine compartment	Hydraulic pump	Remove plug or cap and install pressure gage	

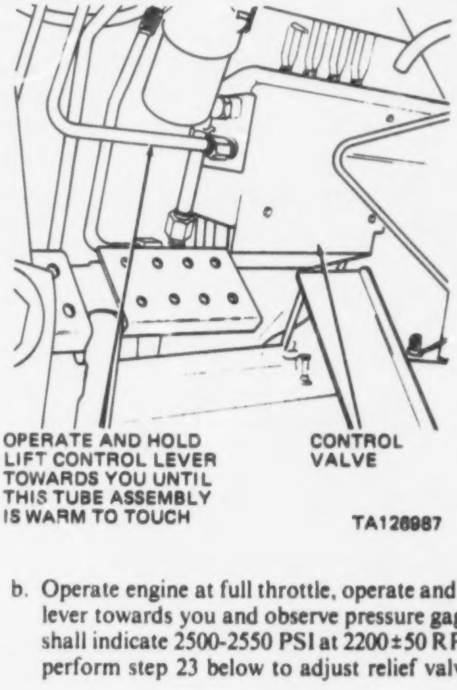

HYDRAULIC PUMP
PLUG
CAP
SUCTION HOSE
MAIN SUPPLY HOSE
SERIAL NUMBER 9150019 AND ABOVE
TA301524

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
22	Operator's compartment	Control valve	a. Operate and hold lift control lever towards you until tube assembly is warm to touch	Warms hydraulic oil


OPERATE AND HOLD LIFT CONTROL LEVER TOWARDS YOU UNTIL THIS TUBE ASSEMBLY IS WARM TO TOUCH
CONTROL VALVE

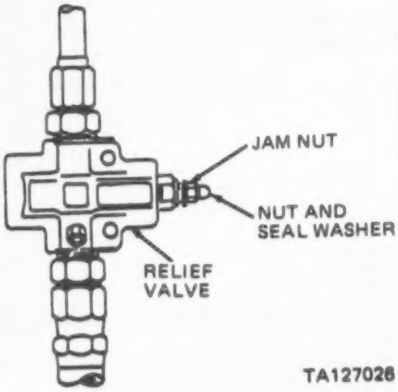
TA126987

b. Operate engine at full throttle, operate and hold lift control lever towards you and observe pressure gage reading. Gage shall indicate 2500-2550 PSI at 2200±50 RPM. If necessary, perform step 23 below to adjust relief valve

2-48. STEERING SYSTEM MAINTENANCE (cont)

b. Hoses, Lines and Fittings (cont).

(2) Hydraulic Pump to Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)				
23	Front chassis, bottom right side	Relief valve	a. Remove nut and seal washer b. Loosen jam nut c. Perform step 22 above d. Operate engine at full throttle, observe pressure gage, and adjust relief valve adjusting screw until 2500-2550 PSI indication is obtained e. Tighten jam nut f. Reinstall seal washer and nut on relief valve g. Turn engine off and perform step 20 above	
24	Engine compartment	Hydraulic pump	a. Remove pressure gage b. Install plug or cap c. Perform step 19 above	

2-48. STEERING SYSTEM MAINTENANCE (cont)

c. Steering Cylinder Assembly.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

TOOLS

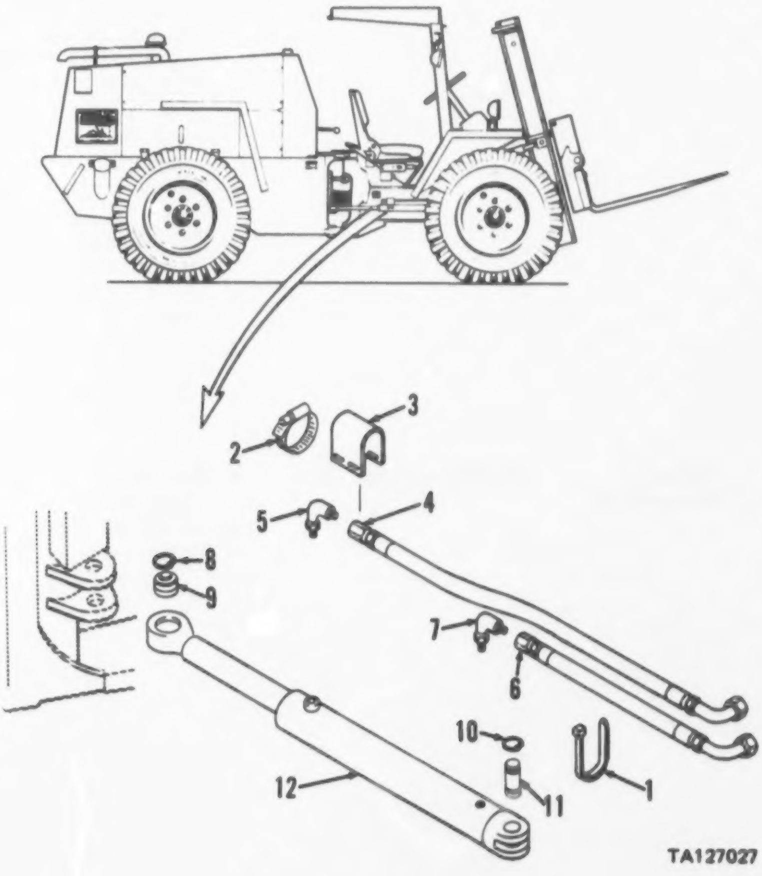
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Chain Hoist, 1/4 ton capacity	
Thread Cutting Tap, 9/16-18	NSN 5136-00-580-7186

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked straight on level surface, engine off, and parking brake applied.
2-4b(1)	Shipping lock pin installed.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Tie straps (2)

KEY
1. Tie strap
2. Hose clamps
3. Steering cylinder guard
4. Hose fitting
5. Elbow
6. Hose fitting
7. Elbow
8. Retaining ring
9. Pin
10. Retaining ring
11. Pin
12. Steering cylinder assembly



TA127027

2-48. STEERING SYSTEM MAINTENANCE (cont)

c. Steering Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				

NOTE

Removal of either steering cylinder assembly is the same.

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Side of vehicle	a. Steering cylinder assembly (12) and hydraulic connections	Clean	Use cleaning solvent P-D-680
		b. Tie strap (1)	Remove	
		c. Two hose clamps (2)	Loosen and remove	
		d. Steering cylinder guard (3)	Remove	
		e. Hose fitting (4)	Disconnect and plug	Prevents intrusion of dirt
		f. Elbow (5)	Remove and plug opening in cylinder (12)	Prevents intrusion of dirt
		g. Hose fitting (6)	Disconnect and plug	Prevents intrusion of dirt
		h. Elbow (7)	Remove and plug	Prevents intrusion of dirt
		i. Steering cylinder assembly (12)	Support with chain hoist, or jack stand or appropriate block	
		j. Retaining ring (8)	Remove	
		k. Pin (9)	Remove	
		l. Retaining ring (10)	Remove	
		m. Pin (11)	Remove	
		n. Steering cylinder assembly (12)	Remove to clean work area	

2-48. STEERING SYSTEM MAINTENANCE (cont)

c. Steering Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
3		Hose clamps (2) and steering cylinder guard (3)	Inspect	Replace if damaged
4		Hose fittings (4 and 6)	Inspect	Replace hose assembly if threads damaged
5		Elbows (5 and 7)	Inspect	Replace if cracked, distorted, or threads damaged
6		Retaining rings (8 and 10) and pins (9 and 11)	Inspect	Replace if cracked, bent, or distorted
7		Steering cylinder assembly (12)	Inspect	Replace if cracked or distorted. Check internal threads for damage; chase using 9/16-18 UNF tap
INSTALLATION/REPLACEMENT				
8	Side of vehicle	a. Steering cylinder assembly (12)	Position	
		b. Pin (11)	Install	
		c. Retaining ring (10)	Install	
		d. Pin (9)	Install	
		e. Retaining ring (8)	Install	
		f. Elbow (7)	Install	
		g. Hose fitting (6)	Connect and tighten	
		h. Elbow (5)	Install	

2-48. STEERING SYSTEM MAINTENANCE (cont)

c. Steering Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
8 (cont)		i. Hose fitting (4)	Connect and tighten	
		j. Steering cylinder guard (3)	Position above hose fitting (4)	
		k. Two hose clamps (2)	Thread through guard (3) and around cylinder (12). Tighten	
		l. Tie strap (1)	Install around hoses and tie	
9	Operator's compartment		Start engine and turn steering wheel to extreme right and left several times to expell air	
10	Hydraulic reservoir	Oil level dipstick and fill	Check oil level; add oil necessary	Refer to current lubrication order

Section IX. BODY, CAB AND ROLL OVER PROTECTIVE STRUCTURE MAINTENANCE

This section contains the information you need to maintain the

- Body
- Cab
- Pintle hook
- Roll over protective structure (ROPS)

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of organizational maintenance.

	Para
Troubleshooting Symptom Index	2-49
Frame and Towing Attachments Troubleshooting	2-50
Body, Cab and Hood Troubleshooting	2-51
Frame and Towing Attachments Maintenance	2-52
Roll Over Protective Structure	2-52a
Chassis Stop Bumper	2-52b
Tow Bar, Tow Chains and Pintle Hook	2-52c
Body, Cab and Hood Maintenance	2-53
Grille	2-53a
Fenders	2-53b
Side Panels	2-53c
Top Hood	2-53d
Hood Panels and Support Plates	2-53e
Front Cover Panel	2-53f
Operator's Seat	2-53g
Noise Baffle Mat	2-53h
Chassis Floor Plate and Guard	2-53i

2-49. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
FRAME AND TOWING ATTACHMENTS		
Pintle hook stuck	2-50/1	3-352
Loud clunk heard when vehicle turns	2-50/2	3-352
Tow bar does not pivot or latch	2-50/3	3-353
BODY, CAB AND HOOD		
Side panel does not latch	2-51/1	3-353
Seat will not adjust	2-51/2	3-354

2-50. FRAME AND TOWING ATTACHMENTS TROUBLESHOOTING

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

1. PINTLE HOOK STUCK

Check pintle hook for obstruction, damage or wear.

Replace pintle hook (para 2-52c).

2. LOUD CLUNK HEARD WHEN VEHICLE TURNS

Inspect chassis stop bumper for damage or wear.

Replace chassis stop bumper (para 2-52b).

2-50. FRAME AND TOWING ATTACHMENTS TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. TOW BAR DOES NOT PIVOT OR LATCH

Step 1. Check chassis where tow bar is attached for obstructions.

a. If obstructed, remove obstruction.

b. If not obstructed, proceed to step 2.

Step 2. Check chassis, tow bar, and mounting hardware for cracks or dents.

a. If tow bar is dented or cracked, replace (para 2-52c).

b. If tow bar is okay, proceed to step 3.

Step 3. Check tow bar bracket for loose mounting, dents, or cracks.

Tighten mounting hardware; replace bracket if cracked or dented (para 2-52c).

2-51. BODY, CAB AND HOOD TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. SIDE PANEL DOES NOT LATCH

Step 1. Inspect hood panel lock bracket on chassis for damage, dents or missing condition. Check for loose mounting hardware.

a. Replace hood panel lock bracket (para 2-53c), if damaged or dented; tighten loose mounting hardware.

b. If bracket is okay and hardware is tight, proceed to step 2.

Step 2. Check hood panel hook for damage, cracks, or missing condition. Check hook for unrestricted movement.

a. If hood panel hook is damaged, cracked or missing, replace (para 2-53c).

b. If hood panel hook is okay, proceed to step 3 below.

Step 3. Check side panels for damage or dents.

Replace side panels if damaged or dented.

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2-51. BODY, CAB AND HOOD TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. SEAT WILL NOT ADJUST

Step 1. Check seat adjuster and immediate area for obstructions.

a. If obstructions are present, remove.

b. If no obstructions are present, proceed to step 2.

Step 2. Inspect adjuster lever and spring for cracks, damage, or missing condition.

a. If adjuster lever and spring are cracked, missing, or damaged, replace (para 2-53g).

b. If adjuster lever and spring are okay, proceed to step 3.

Step 3. Inspect seat adjusters for distortion, damage or misalinement.

a. Replace if distorted, damaged or misalined (para 2-53g).

b. If seat adjusters are okay, check seat adjuster mounting hardware for looseness or missing condition. Tighten or replace mounting hardware (para 2-53g).

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE

a. Roll Over Protective Structure.

This task covers: a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hoist, 1/2 ton capacity

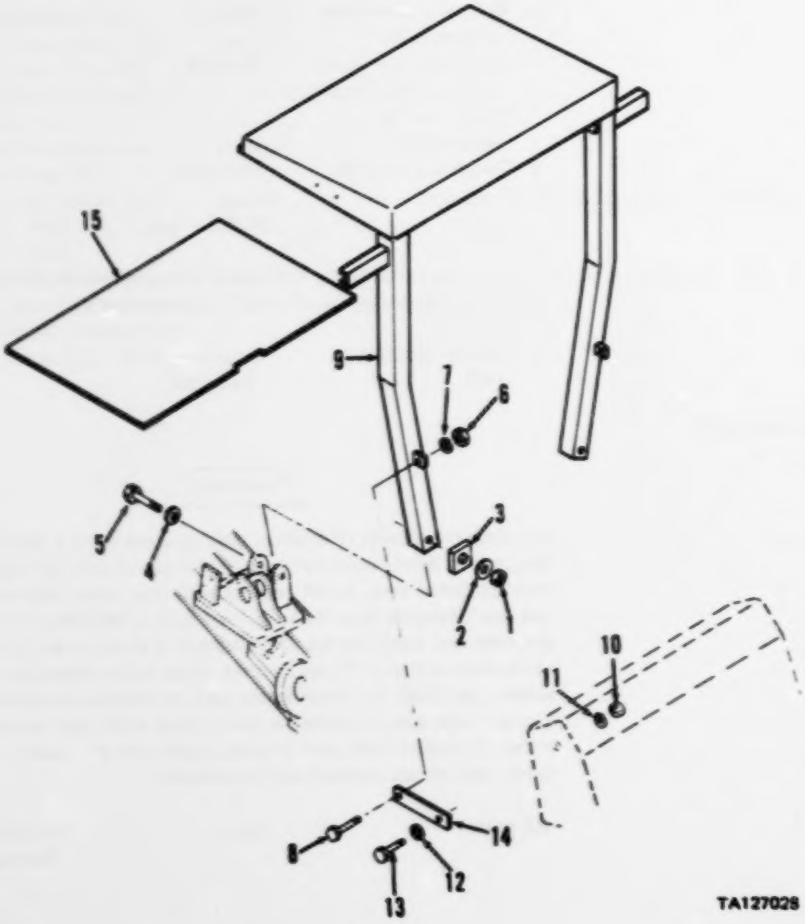
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Vinyl adhesive, one pint can (FSCM 13842 P/N 1099)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off and parking brake applied.
2-30a	Front flood lights removed.
2-30b	Front blackout light removed.
2-53h	Noise baffle mat removed.

KEY

1. Nuts
2. Washers
3. Reinforcing plates
4. Washers
5. Cap screws
6. Nuts
7. Lock washers
8. Cap screws
9. Roll over protective structure
10. Nuts
11. Lock washers
12. Washers
13. Cap screws
14. Brackets
15. Canopy headlining



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2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

a. Roll Over Protective Structure (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment	a. Three wire leads	Tag and disconnect	Located at bottom of ROPS, two on left, one on right
		b. Roll over protective structure (9)	Secure	Attach hoist
		c. Two nuts (1), washers (2), reinforcing plates (3), washers (4), and cap screws (5)	Remove	
		d. Two nuts (6), lock washers (7), and cap screws (8)	Remove	
		e. Roll over protective structure (9)	Remove	Use hoist
		f. Two nuts (10), lock washers (11), washers (12), and cap screws (13)	Remove	
		g. Two brackets (14)	Remove	
		NOTE Don't perform following step unless inspection indicates replacement of canopy headlining (15) is necessary.		
		h. Canopy headlining (15)	Remove only if damaged	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

a. Roll Over Protective Structure (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR				
3		Roll over protective structure (9)	Inspect	ROPS must be replaced if damaged, bent, broken, or welds show cracks or breaks. No repair authorized.
4		All other parts	Inspect	Replace if cracked, damaged, bent, broken, distorted or damaged threads
INSTALLATION/REPLACEMENT				
5	Operator's compartment	a. Canopy headlining (15)	Apply adhesive and position	Use adhesive FSCM 13842 P/N 1099
		b. Two brackets (14)	Position	
		c. Two cap screws (13), washers (12), lock washers (11), and nuts (10)	Install	
		d. Roll over protective structure (9)	Position	Use hoist
		e. Two cap screws (8), lock washers (7), and nuts (6)	Install	Tighten to 290-300 pounds foot torque
		f. Two cap screws (5), washers (4), reinforcing plates (3), washers (2), and nuts (1)	Install	Tighten to 290-300 pounds foot torque. Remove hoist

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

b. Chassis Stop Bumper.

This task covers: a. Removal
b. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

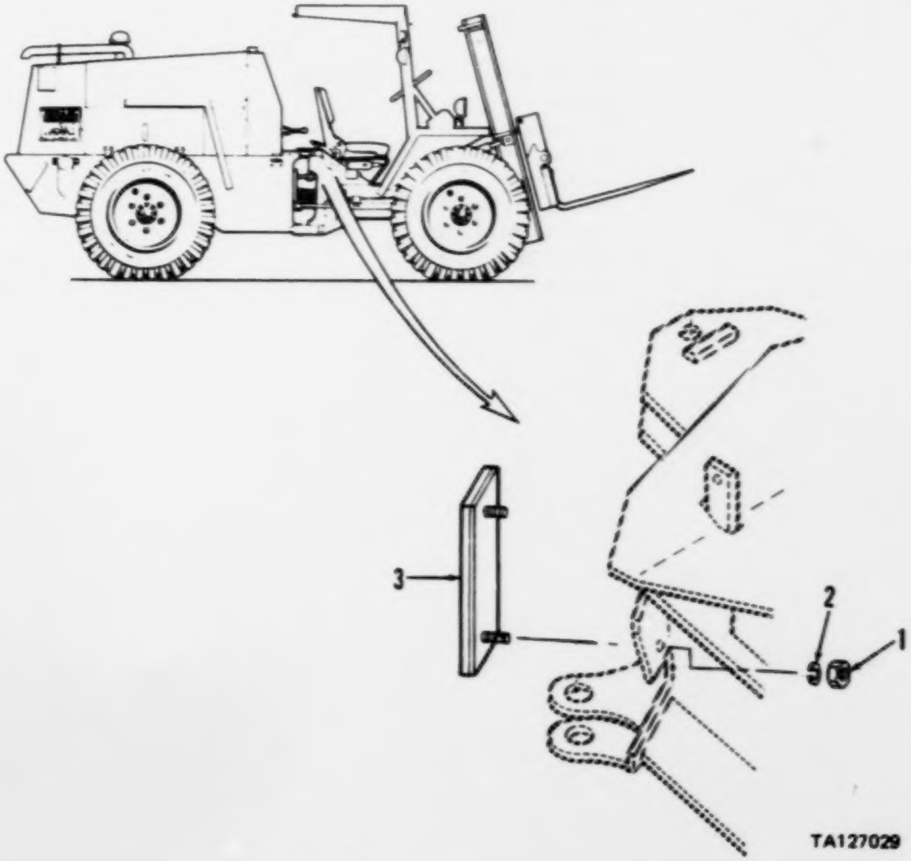
MATERIALS/PARTS
Chassis stop bumper

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.

KEY

1. Nuts
2. Lock washers
3. Chassis stop bumper



2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

a. Chassis Stop Bumper (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, rear	a. Two nuts (1) and lock washers (2)	Remove	
		b. Chassis stop bumper (3)	Remove and discard	
INSTALLATION				
2	Operator's compartment, rear	a. Chassis stop bumper (3)	Position	
		b. Two lock washers (2) and nuts (1)	Install	

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

c. Tow Bar, Tow Chains and Pintle Hook.

This task covers:		
	a. Removal	c. Inspection
	b. Cleaning	d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

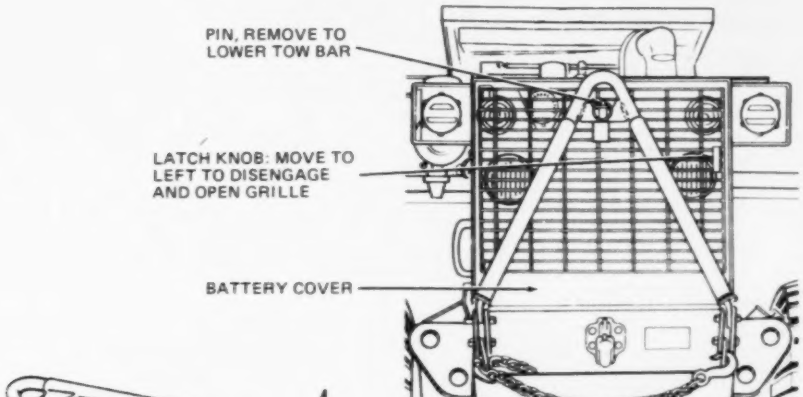
MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.


PIN, REMOVE TO LOWER TOW BAR
LATCH KNOB: MOVE TO LEFT TO DISENGAGE AND OPEN GRILLE
BATTERY COVER
4
5
2
8
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11
12
1
6
9

TA127030

KEY

1. Nuts
2. Washers
3. Cap screws
4. Washers
5. Tow bar
6. Nuts
7. Cap screws
8. Chains
9. Nuts
10. Cap screws
11. Lock washers
12. Pintle hook

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

c. *Tow Bar, Tow Chains and Pintle Hook (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Rear of vehicle	a. Pin	Remove	Lower tow bar to ground
		b. Two nuts (1), washers (2), cap screws (3), and washers (4)	Remove	
		c. Tow bar (5)	Remove	
		d. Two chains (8)	Unhook	Lay chains on ground
		e. Two nuts (6) and cap screws (7)	Remove	
		f. Two chains (8)	Remove	
		g. Grille latch knob	Move to left and swing grille outward	
		h. Battery cover	Remove	Loosen fasteners (one each side of cover) and pull cover straight out
		i. Four nuts (9), cap screws (10), and lock washers (11)	Remove	Support pintle hook (12)
		j. Pintle hook (12)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680; dry thoroughly
INSPECTION				
3		All parts	Inspect	Replace if cracked, damaged, bent, worn or distorted

2-52. FRAME AND TOWING ATTACHMENTS MAINTENANCE (cont)

c. *Tow Bar, Tow Chains and Pintle Hook (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
4	Rear of vehicle	a. Pintle hook (12)	Position	
		b. Four cap screws (10), lock washers (11), and nuts (9)	Install	
		c. Battery cover	Install	
		d. Radiator grille	Close	
		e. Two chains (8)	Position	
		f. Two cap screws (7) and nuts (6)	Install	
		g. Tow bar (5)	Position	
		h. Two cap screws (3), washers (2 and 4) and nuts (1)	Install	
		i. Two chains (8)	Latch onto opposite sides	
		j. Tow bar (5)	Raise into stored position	
		k. Pin	Install	Secures tow bar in raised position

2-53. BODY, CAB AND HOOD MAINTENANCE

a. Grille.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly/Repair
- f. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean diesel fuel
Clean cloths

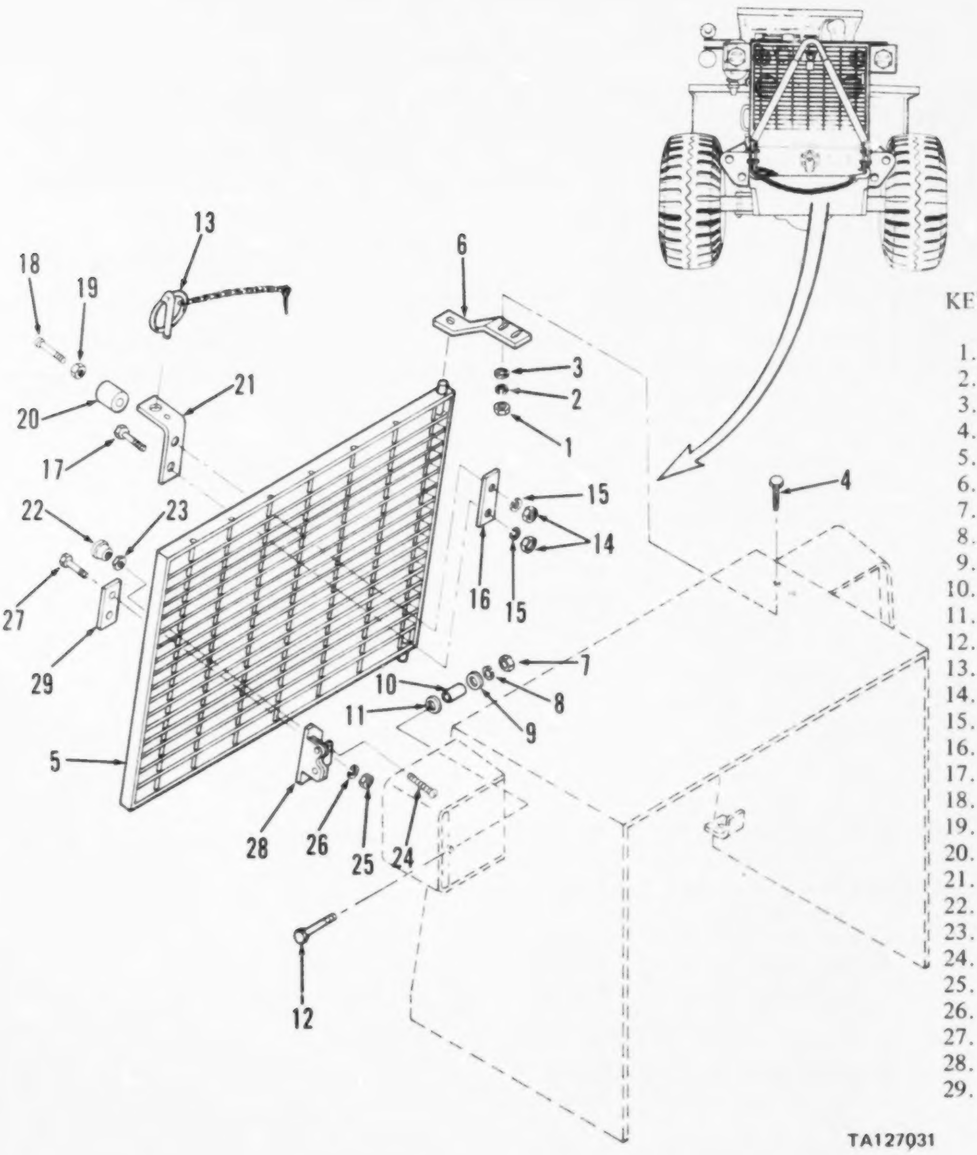
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-52c	Tow bar lowered to ground and grille open.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Rear of vehicle	a. Two nuts (1), lock washers (2), washers (3), and cap screws (4)	Remove	
		b. Grille (5)	Remove	
		c. Pivot bracket (6)	Remove	
		d. Nut (7), lock washer (8), washer (9), spacer (10), washer (11), and cap screw (12)	Remove	
DISASSEMBLY				
2	Grille (5)	a. Tow bar pin (13)	Remove	Straighten cotter pin (part of tow bar pin) to remove
		b. Two nuts (14) and lock washers (15)	Remove	
		c. Mounting plate (16)	Remove	
		d. Cap screw (17)	Remove	
		e. Cap screw (18), nut (19), and bumper (20)	Remove	From tow bar bracket (21)
		f. Tow bar bracket (21)	Remove	
		g. Latch release knob (22)	Remove	
		h. Nut (23) and cap screw (24)	Remove	
		i. Two nuts (25), washers (26), and cap screws (27)	Remove	
		j. Grille latch (28)	Remove	
		k. Latch mounting plate (29)	Remove	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

a. Grille (cont).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TA127031

KEY

1. Nuts
2. Lock washers
3. Washers
4. Cap screws
5. Grille
6. Pivot bracket
7. Nut
8. Lock washer
9. Washer
10. Spacer
11. Washer
12. Cap screw
13. Tow bar pin
14. Nuts
15. Lock washers
16. Mounting plate
17. Cap screw
18. Cap screw
19. Nut
20. Bumper
21. Tow bar bracket
22. Latch release knob
23. Nut
24. Cap screw
25. Nuts
26. Washers
27. Cap screws
28. Grille latch
29. Latch mounting plate

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

a. Grille (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
3		Bumper (20)	Clean	Use clean diesel fuel. Dry thoroughly
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly
INSPECTION				
5		Grille latch (28)	Inspect	Replace if cracked, damaged, or latch malfunctions
6		All other parts	Inspect	Replace if cracked, damaged, worn or distorted
REASSEMBLY/REPAIR				
7	Grille (5)	a. Latch mounting plate (29)	Position	
		b. Grille latch (28)	Position	
		c. Two cap screws (27), washers (26), and nuts (25)	Install	
		d. Cap screw (24) and nut (23)	Install	
		e. Latch release knob (22)	Install	
		f. Nut (19)	Install on cap screw (18)	
		g. Bumper (20)	Install on cap screw (18)	
		h. Tow bar bracket (21)	Position on grille	
		i. Cap screw (18)	Position	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

a. Grille (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY/REPAIR				
7 (cont)	Grille (5) (cont)	j. Mounting plate (16)	Position	
		k. Cap screw (17), two lock washers (15) and nuts (14)	Install	
		l. Tow bar pin (13)	Install	Bend cotter pin (part of tow bar pin)
INSTALLATION/REPLACEMENT				
8	Rear of vehicle	a. Cap screw (12), washer (11), spacer (10), washer (9), lock washer (8), and nut (7)	Install	
		b. Pivot bracket (6)	Position	On grille
		c. Grille (5)	Install	In radiator shroud stops
		d. Two cap screws (4), washers (3), lock washers (2), and nuts (1)	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

b. Fenders.

This task covers:	a. Removal	c. Inspection
	b. Cleaning	d. Installation

INITIAL SETUP

TOOLS		EQUIPMENT CONDITION	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654	Paragraph	Condition Description
			Vehicle parked on level surface, engine off, and parking brake applied.
		2-53c	Side panels removed.

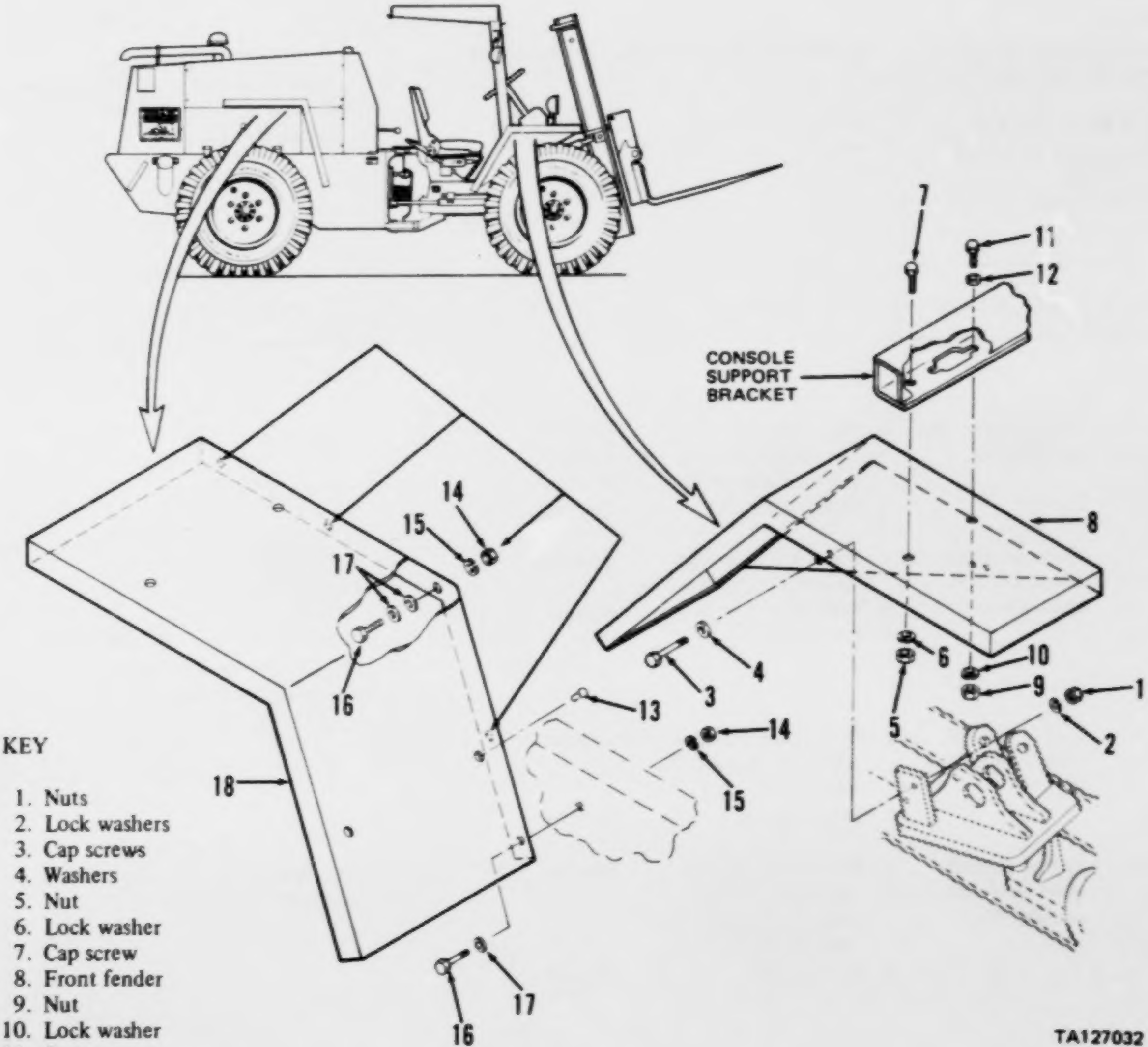
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Stiff wire brush

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Chassis front left or right side	a. Two nuts (1)	Remove	
		b. Two lock washers (2)	Remove	
		c. Two cap screws (3)	Remove	
		d. Two washers (4)	Remove	
2	Console support bracket, left or right side	a. Nut (5), lock washer (6), and cap screw (7)	Remove	
		b. Nut (9)	Loosen	
		c. Fender (8)	Pull out slightly and remove	Cap screw (11), washer (12), lock washer (10) and nut (9) will disengage from slot in console support bracket
3	Left or right front fender (8)	a. Nut (9), lock washer (10), cap screw (11), and washer (12)	Remove	
		b. Two plugs (13)	Remove	
4	Engine compartment, rear, left or right side	a. Five nuts (14), lock washers (15), cap screws (16), and nine washers (17)	Remove	Disconnect hourmeter ground wire when removing rear left fender
		b. Fender (18)	Remove	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

b. Fenders (cont).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12
CONSOLE SUPPORT BRACKET
8
14
15
17
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13
14
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18
3
4
6
10
9
1
2
5
17
16

KEY

1. Nuts
2. Lock washers
3. Cap screws
4. Washers
5. Nut
6. Lock washer
7. Cap screw
8. Front fender
9. Nut
10. Lock washer
11. Cap screw
12. Washer
13. Plugs
14. Nuts
15. Lock washers
16. Cap screws
17. Washers
18. Rear fender

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2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

b. Fenders (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
5		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly. Remove rust using stiff wire brush
INSPECTION				
6		All parts	Inspect	Replace if cracked, damaged, bent, broken, distorted or threads damaged
INSTALLATION				
7	Engine compartment, rear left or right side	a. Fender (18)	Position	
		b. Nine washers (17), five cap screws (16), lock washers (15), and nuts (14)	Install	Connect ground wire when installing rear left fender
8	Left or right front fender (8)	a. Two plugs (13)	Install	
		b. Washer (12), cap screw (11), lock washer (10), and nut (9)	Install	Do not tighten; loosely install in fender
9	Console support bracket, left or right side	a. Fender (8)	Position	Position assembled cap screw (11), and washer (12), in slot in console support bracket
		b. Nut (9)	Tighten	
		c. Cap screw (7), lock washer (6), and nut (5)	Install	
10	Chassis, front left or right side	a. Two washers (4)	Install	
		b. Two cap screws (3)	Install	
		c. Two lock washers (2)	Install	
		d. Two nuts (1)	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

c. Side Panels.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

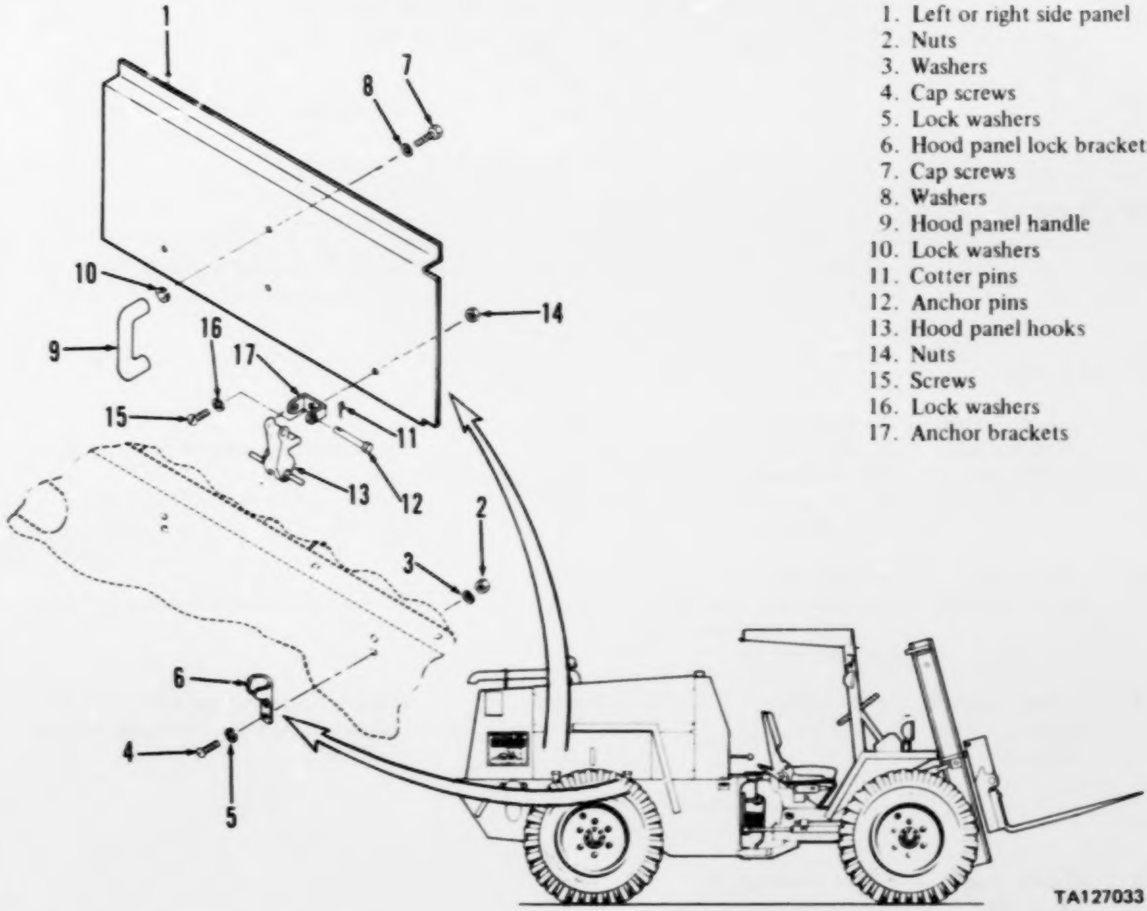
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.

KEY

1. Left or right side panel
2. Nuts
3. Washers
4. Cap screws
5. Lock washers
6. Hood panel lock brackets
7. Cap screws
8. Washers
9. Hood panel handle
10. Lock washers
11. Cotter pins
12. Anchor pins
13. Hood panel hooks
14. Nuts
15. Screws
16. Lock washers
17. Anchor brackets



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2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

c. Side Panels (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, left or right side	a. Hood panel hook (13)	Push down and release from lock bracket (6)	
		b. Hood panel handle (9)	Grasp	
		c. Side panel (1)	Remove	Pull outward on handle
		NOTE Perform following steps only if inspection indicates replacement of bracket (6) is necessary.		
2	Left or right side of vehicle, chassis	a. Four nuts (2), washers (3), cap screws (4), and lock washers (5)	Remove	
		b. Two hood panel lock brackets (6)	Remove	
DISASSEMBLY				
3	Left or right side panel (1)	a. Two cap screws (7) and washers (8)	Remove	
		b. Hood panel handle (9) and two lock washers (10)	Remove	
		c. Two cotter pins (11)	Remove	
		d. Two anchor pins (12)	Remove	
		e. Two hood panel hooks (13)	Remove	
		f. Two nuts (14), screws (15), and lock washers (16)	Remove	
		g. Two anchor brackets (17)	Remove	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

c. Side Panels (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly
INSPECTION				
5		All parts	Inspect	Replace if damaged, cracked, bent, distorted or threads damaged
REASSEMBLY				
6	Left or right side	a. Two anchor brackets (17)	Position	
		b. Two lock washers (16), screws (15), and nuts (14)	Install	
		c. Two hood panel hooks (13)	Position	
		d. Two anchor pins (12)	Install	
		e. Two cotter pins (11)	Install	
		f. Two lock washers (10) and hood panel handle (9)	Install	
		g. Two washers (8) and cap screws (7)	Install	
INSTALLATION				
7	Left or right side of vehicle, chassis	a. Two hood panel lock brackets (6)	Position	
		b. Four lock washers (5), cap screws (4), washers (3), and nuts (2)	Install	
8	Engine compartment, left or right side	a. Side panel (1)	Install	Force into position
		b. Hood panel hook (13)	Pull down and engage in lock bracket (6)	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

d. Top Hood.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

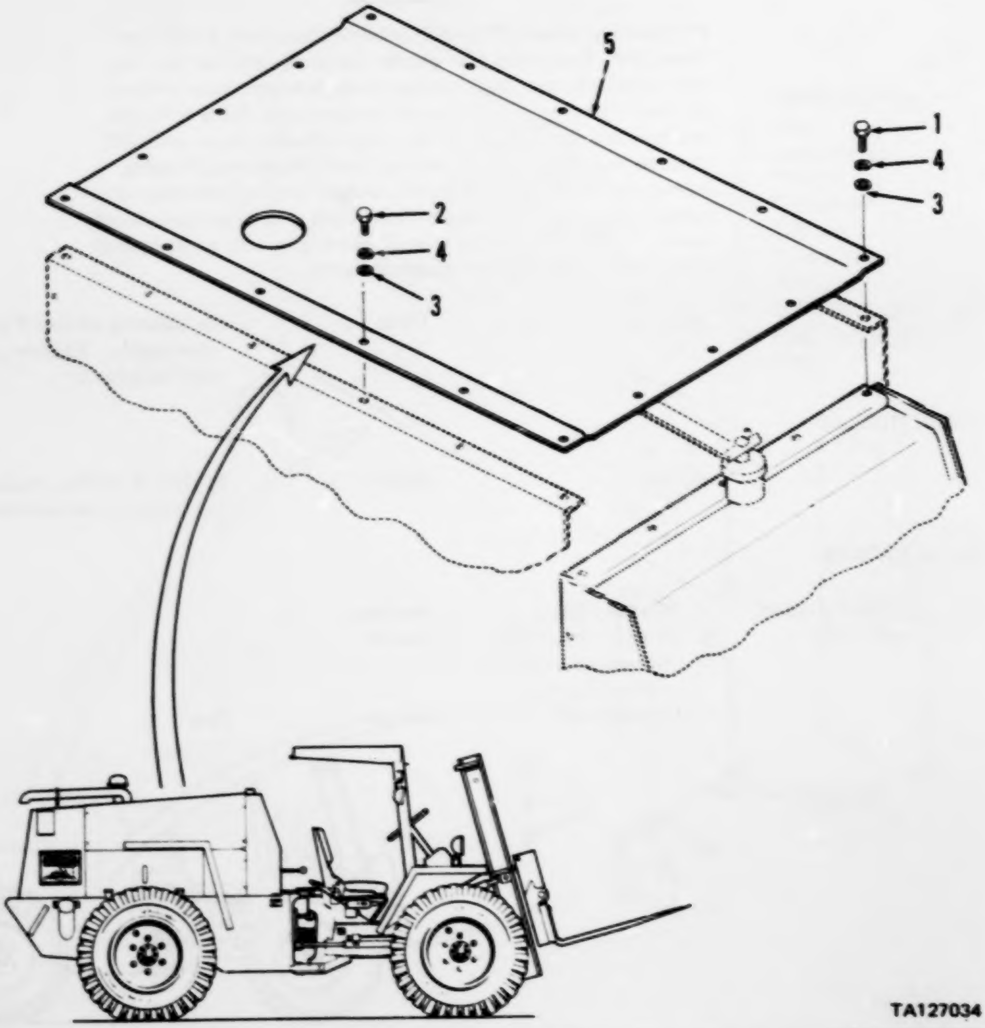
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Stiff wire brush
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-16	Exhaust pipe removed.



KEY

1. Cap screws
2. Cap screws
3. Washers
4. Lock washers
5. Top hood

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

d. Top Hood (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment	a. 18 cap screws (1 and 2), washers (3), and lock washers (4)	Remove	
		b. Top hood (5)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly. Remove any rust with stiff wire brush
INSPECTION				
3		All parts	Inspect	Replace if cracked, damaged, bent, distorted or threads damaged
INSTALLATION				
4	Engine compartment, top	a. Top hood (5)	Position	
		b. 18 lock washers (4), washers (3), and cap screws (2 and 1)	Install	
		c. Exhaust pipe	Install	Para 2-16

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

e. Hood Panels and Hood Support Plates.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

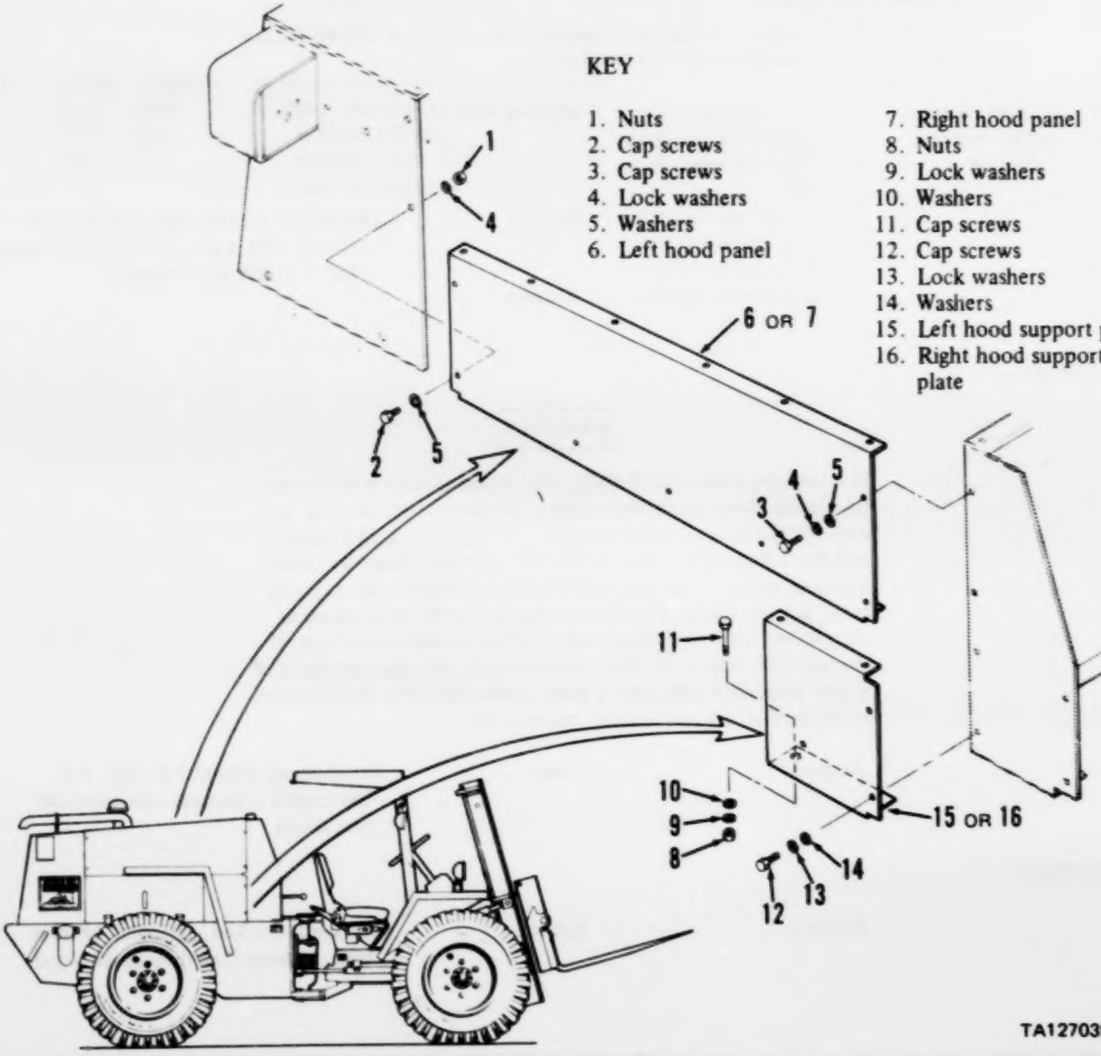
MATERIALS/PARTS
Cleaning solvent P-D-680
Stiff wire brush
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-15c	Air cleaner removed (left hood panel removal only)
2-29a	Slave receptacle removed.
2-29b	Hourmeter removed.
2-53b	Rear fenders removed.

KEY

1. Nuts
2. Cap screws
3. Cap screws
4. Lock washers
5. Washers
6. Left hood panel
7. Right hood panel
8. Nuts
9. Lock washers
10. Washers
11. Cap screws
12. Cap screws
13. Lock washers
14. Washers
15. Left hood support plate
16. Right hood support plate



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2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

e. Hood Panels and Hood Support Plates (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, upper left or right side	a. Two nuts (1), four cap screws (2 and 3), lock washers (4), and washers (5)	Remove	
		b. Hood panel (6 or 7)	Remove	
		NOTE If top hood is not removed (para 2-53d) you must remove six cap screws, washers and lock washers.		
2	Engine compartment, left or right side	a. Three nuts (8), lock washers (9), washers (10), and cap screws (11)	Remove	
		b. Two cap screws (12), lock washers (13), and washers (14)	Remove	Disconnect ground cable and remove ground cable washer if left hood support plate (15) is being removed
		c. Hood support plate (15 or 16)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly. Remove rust with stiff wire brush
INSPECTION				
4		All parts	Inspect	Replace if cracked, damaged, broken, bent, distorted, or threads damaged

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

e. Hood Panels and Hood Support Plates (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
5	Engine compartment, left or right side	a. Hood support plate (15 or 16)	Position	
		b. Two washers (14), lock washers (13), and cap screws (12)	Install	Connect ground cable and ground cable washer only if left hood support plate (15) is being installed
		c. Three cap screws (11), washers (10), lock washers (9) and nuts (8)	Install	Be sure clamp securing cold start tube and air cleaner indicator tube is installed
6	Engine compartment, upper left or right side	a. Hood panel (6 or 7)	Position	
		b. Four washers (5), lock washers (4), cap screws (3 and 2), and two nuts (1)	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

f. Front Cover Panel.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Stiff wire brush
Clean cloths

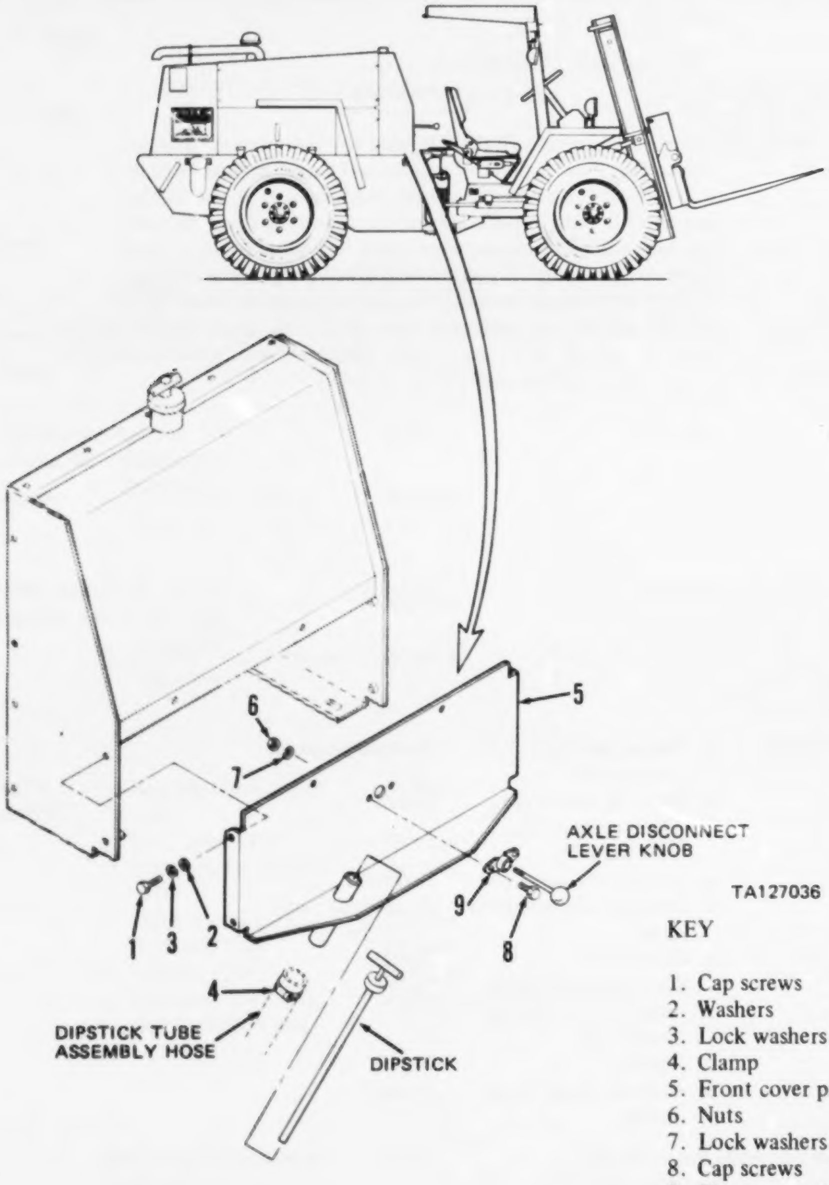
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, rear	a. Axle disconnect lever knob	Remove	Unscrew to remove
		b. Six cap screws (1), washers (2), and lock washers (3)	Remove	
		CAUTION		
		To prevent entry of foreign material into transmission and thus damaging it, plug tube and hose after removal of dipstick and front cover plate, respectively.		
		c. Dipstick	Remove	
		d. Clamp (4)	Loosen	Reach underneath panel (5)
		e. Front cover panel (5)	Remove	
		f. Two nuts (6), lock washers (7), and cap screws (8)	Remove	
		g. Flange mounted bearing (9)	Remove	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

f. Front Cover Panel (cont).


5
6
7
AXLE DISCONNECT
LEVER KNOB
1
3
2
9
8
4
DIPSTICK TUBE
ASSEMBLY HOSE
DIPSTICK

TA127036

KEY

1. Cap screws
2. Washers
3. Lock washers
4. Clamp
5. Front cover panel
6. Nuts
7. Lock washers
8. Cap screws
9. Flange mounted bearing

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

f. Front Cover Panel (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly. Remove rust using stiff wire brush
INSPECTION				
3		All parts	Inspect	Replace if cracked, damaged, broken, bent, distorted, missing or damaged threads
INSTALLATION				
4	Operator's compartment	a. Flange mounted bearing (9)	Position on panel (5)	
		b. Two cap screws (8), lock washers (7), and nuts (6)	Install	
		c. Front cover panel (5)	Position	
		d. Dipstick tube assembly hose	Connect to panel (5) tube	
		e. Clamp (4)	Tighten	
		f. Six washers (3), lock washers (2), and cap screws (1)	Install	
		g. Dipstick	Install	
		h. Axle disconnect lever knob	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

g. Operator's Seat.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Mild detergent
Water
Cleaning solvent P-D-680
Clean cloths

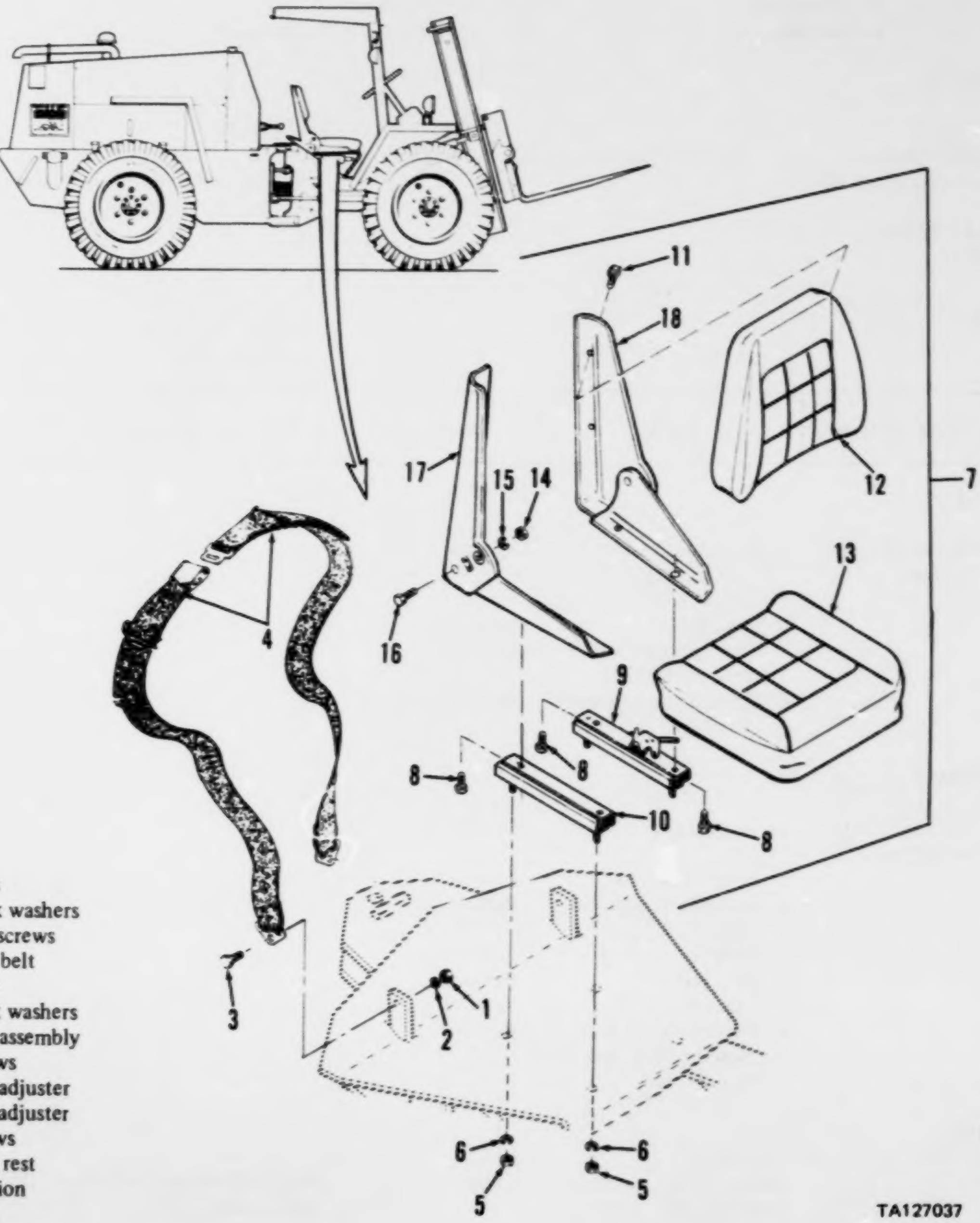
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment	a. Two nuts (1), lock washers (2), and cap screws (3)	Remove	
		b. Seat belt (4)	Remove	
		c. Four nuts (5), and lock washers (6)	Remove	
		d. Operator's seat assembly (7)	Remove	
DISASSEMBLY				
2	Right rail (17), and left rail (18)	a. Seat adjusters (9 and 10)	Extend	
		b. Four screws (8)	Remove	
		c. Seat adjusters (9 and 10)	Remove	
		d. Eight screws (11)	Remove	
		e. Back rest (12)	Remove	
		f. Cushion (13)	Remove	
		g. Two nuts (14), lock washers (15), and screws (16)	Remove	
CLEANING				
3		Back rest (12), cushion seat belt (4)	Clean	Use mild detergent and water. Dry thoroughly

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

g. Operator's Seat (cont).


11
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16
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6
6
5
5
TA127037

KEY

1. Nuts
2. Lock washers
3. Cap screws
4. Seat belt
5. Nuts
6. Lock washers
7. Seat assembly
8. Screws
9. Seat adjuster
10. Seat adjuster
11. Screws
12. Back rest
13. Cushion
14. Nuts
15. Lock washers
16. Screws
17. Right rail
18. Left rail

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

g. Operator's Seat (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly
INSPECTION				
5		Back rest (12), and cushion (13)	Inspect	Replace if damaged, worn, cracked or slit
6		Seat belt (4)	Inspect	Replace if damaged, worn, slit or buckles damaged
7		Seat adjusters (10 and 9)	Inspect	Replace if damaged, worn, cracked, distorted or does not slide freely
8		All other parts	Inspect	Replace if damaged, worn, cracked, distorted or threads damaged
REASSEMBLY				
9	Left rail (18), and right rail (17)	a. Two screws (16), lock washers (15), and nuts (14)	Install	
		b. Cushion (13)	Position	
		c. Back rest (12)	Position	
		d. Eight screws (11)	Install	
		e. Seat adjusters (10 and 9)	Position	Extend adjuster. Line up screw hole with rail holes
		f. Four screws (8)	Install	
INSTALLATION/REPLACEMENT				
10	Operator's compartment	a. Seat assembly (7)	Position	
		b. Four lock washers (6) and nuts (5)	Install	
		c. Seat belt (4)	Position	
		d. Two cap screws (3), lock washers (2), and nuts (1)	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

h. Noise Baffle Mat.

This task covers: a. Removal
b. Installation

INITIAL SETUP

TOOLS

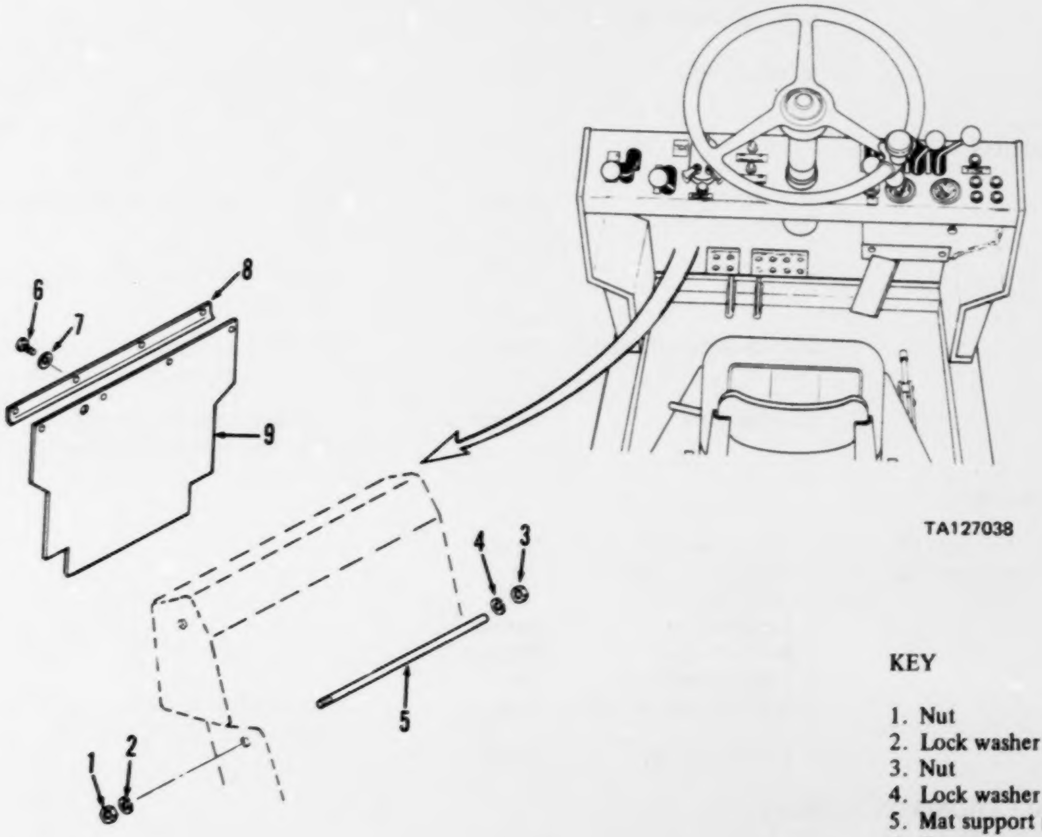
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Replacement noise baffle mat

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.



TA127038

KEY

1. Nut
2. Lock washer
3. Nut
4. Lock washer
5. Mat support rod
6. Cap screws
7. Washers
8. Mounting strap
9. Noise baffle mat

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

h. Noise Baffle Mat (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment	a. Nut (1) and lock washer (2)	Remove	
		b. Mat support rod (5)	Remove from opposite side of instrument panel	
		c. Nut (3) and lock washer (4)	Remove	
		d. Four cap screws (6) and washers (7)	Remove	
		e. Mounting strap (8)	Remove	
		f. Noise baffle mat (9)	Remove	
INSTALLATION				
2	Operator's compartment	a. Noise baffle mat (9)	Position on edge of instrument panel	
		b. Mounting strap (8)	Position on noise baffle mat (9)	
		c. Four washers (7) and cap screws (6)	Install	
		d. Lock washer (4) and nut (3)	Position on end of mat support rod (5)	
		e. Mat support rod (5)	Install from one side of instrument panel	
		f. Lock washer (2) and nut (1)	Install	

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

i. Chassis Floor Plate and Guard.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

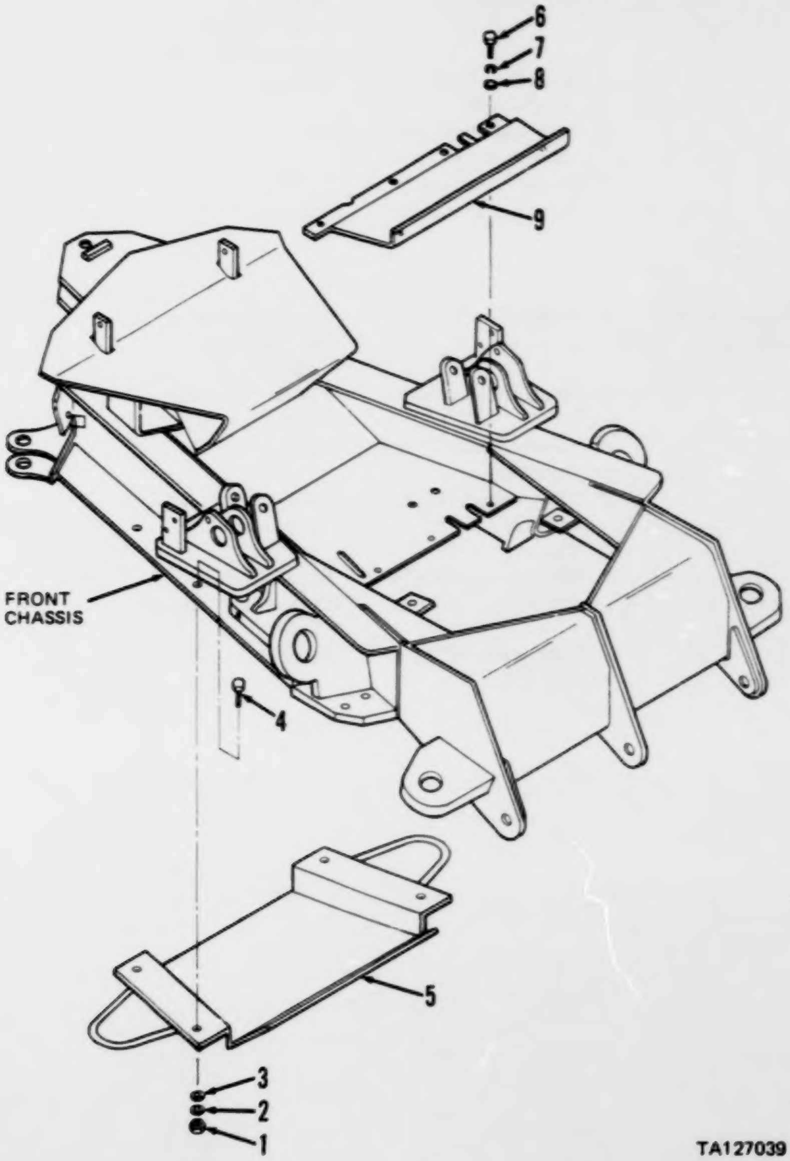
INITIAL SETUP

TOOLS
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.



KEY

1. Hex nuts
2. Lock washers
3. Washers
4. Cap screws
5. Guard
6. Cap screws
7. Lock washers
8. Washers
9. Floor plate

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

i. Chassis Floor Plate and Guard (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Bottom of front chassis	a. Four nuts (1), washers (2 and 3) and cap screws (4)	Loosen and remove	Support guard (5)
		b. Guard (5)	Remove	Grasp handles and lower from vehicle
2	Operator's compartment floor	a. Six cap screws (6), lock washers (7), and washers (8)	Loosen and remove	
		b. Chassis floor plate (9)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air

2-53. BODY, CAB AND HOOD MAINTENANCE (cont)

i. Chassis Floor Plate and Guard (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Cap screws (4 and 6), hex nuts (1), and washers (2, 3, 7 and 8)	Inspect	Replace if worn, or if threads damaged
5		Guard (5) and floor plate (9)	Inspect	Repair small cracks by welding. Replace if severely cracked or damaged
INSTALLATION				
6	Operator's compartment floor	a. Chassis floor plate (9)	Position	Guide slots on floor plate over pedals and lower onto chassis
		b. Six washers (8), lock washers (7), and cap screws (6)	Install and tighten	Until floor plate is securely mounted
7	Bottom of front chassis	a. Guard (5)	Position	Use hydraulic jack, blocks or assistants to hold guard against bottom of chassis
		b. Four cap screws (4), washers (3), lock washers (2), and hex nuts (1)	Install and tighten	Until guard is securely mounted

Section X. HYDRAULIC LIFT SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the hydraulic lift system. It gives you instructions on how to troubleshoot problems, and repair or replace components that are within the scope of organizational maintenance.

Para
Troubleshooting Symptom Index 2-54
Hydraulic Lift System Troubleshooting 2-55
Hydraulic Lift System Maintenance 2-56
  Operational Test 2-56a
  Control Levers and Linkages 2-56b
Para
Lifting Forks 2-56c
Lift Chains and Pulleys 2-56d
Sideshift Chains and Pulleys 2-56e
Hoses, Lines and Fittings 2-56f
Hydraulic Reservoir 2-56g

2-54. TROUBLESHOOTING SYMPTOM INDEX

NOTE

A hydraulic system schematic is located at the back of this manual in appendix F.

	Para/Malfunction	Page
HYDRAULIC LIFT SYSTEM		
Load lowers too fast	2-55/1	3-289
Load creeps downward	2-55/2	3-290
Unable to lift, tilt, shift, or rotate load	2-55/3	3-290
Lift, tilt, shift, or rotate too slow	2-55/4	3-291
Load creeps while tilting	2-55/5	3-291

2-55. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

NOTE

Also refer to paragraph 2-56a, operational test, for additional troubleshooting data.

1. LOAD LOWERS TOO FAST

Step 1. Check hoses, lines and fittings between control valve and lift cylinder assembly for oil leaks.

a. If oil leakage is observed, tighten fittings; if hoses or lines are damaged, replace (para 2-56f(1)).

b. If oil leakage is not observed, proceed to step 2.

2-55. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. LOAD LOWERS TOO FAST (cont)

Step 2. Lower mast assembly to ground.
Turn engine off and relieve hydraulic pressure by operating control levers several times.
Place container under lift cylinder to catch hydraulic oil.
Loosen and disconnect fitting at lift cylinder port; remove elbow.
Check that restrictor is properly installed: FLOW arrow marked on restrictor pointing towards lift cylinder assembly.

a. If restrictor is not installed properly, install properly.

b. If restrictor is installed properly and problem still exists, replace restrictor.

2. LOAD CREEPS DOWNWARD

Step 1. Check hoses, lines and fittings between control valve and lift cylinder assembly for oil leaks.

a. If oil leakage is observed, tighten fittings; if hoses or lines are damaged, replace (para 2-56f(1)).

b. If oil leakage is not observed, proceed to step 2.

Step 2. Check if lift cylinder assembly requires bleeding of air (para 2-56f(1), step 27).

a. Bleed air from lift cylinder assembly (para 2-56f(1), step 27).

b. If lift cylinder does not require bleeding of air, proceed to step 3.

Step 3. Perform step 2 of MALFUNCTION 1 above.

Same as step 2 of MALFUNCTION 1 above.

3. UNABLE TO LIFT, TILT, SHIFT OR ROTATE LOAD

Step 1. Check hydraulic reservoir oil level.

a. If oil level is not between FULL and ADD marks on dipstick with mast lowered, add hydraulic oil (refer to current lubrication order).

b. If oil level is okay, proceed to step 2.

Step 2. Start engine and operate control levers while observing HYDRAULIC FILTER indicator light on instrument panel.

a. If HYDRAULIC FILTER indicator is lit, replace hydraulic oil filter (para 2-56g(2)).

b. If HYDRAULIC FILTER indicator is not lit, turn engine off, place IGNITION switch in LAMP TEST position and check that HYDRAULIC FILTER indicator is on. If HYDRAULIC FILTER indicator is on, proceed to step 3. If HYDRAULIC FILTER indicator is not on, replace bulb (para 2-28e), and repeat this step.

2-55. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. UNABLE TO LIFT, TILT, SHIFT OR ROTATE LOAD (cont)

Step 3. Remove strainer from hydraulic reservoir and check for blockage (para 2-56g(3)).

a. If hydraulic reservoir strainer is clogged, clean (para 2-56g(3)).

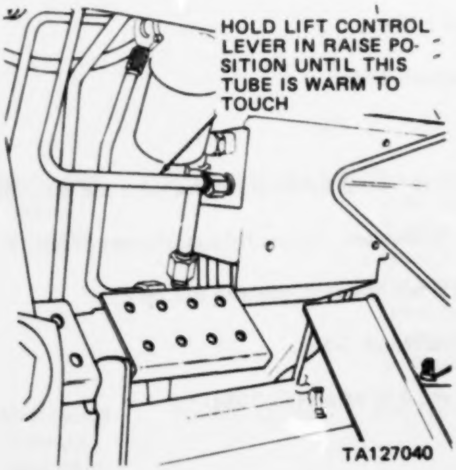
b. If hydraulic reservoir strainer is okay, proceed to step 4.

Step 4. Check setting of relief valve (para 2-48b(2), step 20).

a. Adjust pressure relief valve if setting is not 2500-2550 PSI (para 2-48b(2), step 23).

b. If pressure relief valve setting is okay, proceed to step 5.

Step 5. Check for contaminated oil.
Start engine and operate at idle speed.
Place lift control lever in RAISE position and hold until tube located as shown below feels warm to touch (mast will be at full height).


HOLD LIFT CONTROL LEVER IN RAISE POSITION UNTIL THIS TUBE IS WARM TO TOUCH
TA127040

Remove hydraulic reservoir oil filler and take an oil sample:

If hydraulic oil is contaminated as indicated by oil feeling gritty, milky color, or oil is dark and thick or smells scorched, drain and flush hydraulic system, clean strainer, and replace oil filter (para 2-56g).

2-55. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. LIFT, TILT, SHIFT, OR ROTATE TOO SLOW

Step 1. Check hoses, lines and fittings between hydraulic reservoir, pump, and control valve for oil leaks.

a. If oil leakage is observed, tighten fittings; if hoses or lines are damaged, replace (para 2-56f(1)).

b. If oil leakage is not observed, proceed to step 2.

Step 2. Check setting of relief valve (para 2-48b(2), step 20).

a. Adjust pressure relief valve if setting is not 2500-2550 PSI (para 2-48b(2), step 23).

b. If pressure relief valve setting is okay, proceed to step 3.

Step 3. Check hydraulic reservoir oil level.

a. If oil level is not between FULL and ADD marks on dipstick with mast lowered, add hydraulic oil (refer to current lubrication order).

b. If oil level is okay, proceed to step 4.

Step 4. Perform paragraph 2-56a.

Same as in paragraph 2-56a.

5. LOAD CREEPS WHILE TILTING

Step 1. Check hoses, lines and fittings between control valve and tilt cylinder assembly for oil leaks.

a. If oil leakage is observed, tighten fittings; if hoses or lines are damaged, replace (para 2-56f(1)).

b. If oil leakage is not observed, proceed to step 2.

Step 2. Perform step 4 of paragraph 2-56a.

Same as steps 5 and 6 of paragraph 2-56a.

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE

a. *Operational Test.*

This procedure provides an operational test of the control valve, associated cylinder (lift, tilt, rotation, and sideshift) assemblies, and hoses, lines and fittings. This procedure may also be used to quickly troubleshoot the mast assembly to determine what components are defective.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

None

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, parking brake applied and engine off.

STEP	PROCEDURE/ACTION	NORMAL INDICATION	IF INDICATION IS NORMAL	IF INDICATION IS ABNORMAL
1	Check hydraulic reservoir oil level; add hydraulic oil if oil level is not between FULL and ADD marks on dipstick with mast lowered (refer to current lubrication order)	–	–	–
2	Start engine and operate at idle speed	–	–	–
3	Place lift control lever in RAISE position; release lever when mast reaches full height	Mast moves upward smoothly	Proceed to step 4	Check hoses, lines and fittings between control valve and lift cylinder assembly for oil leaks. Tighten loose fittings/replace leaking hose (para 2-56f). Check lift chains and pulleys for wear or damage; replace as necessary (para 2-56d). If hoses, lines, fittings, lift chains and pulleys okay, notify direct support maintenance
4	Place tilt control lever in FWD position; release when mast is in full forward position	Mast moves forward smoothly	Proceed to step 7	Proceed to step 5
5	With mast in full forward position, disconnect fitting at rod end of tilt cylinder assemblies and plug fitting. Place tilt control lever in FWD position and hold	No oil leakage at tilt cylinder assemblies port where fitting disconnected	Reconnect fitting to tilt cylinder assemblies. Proceed to step 6	Notify direct support maintenance (tilt cylinder assembly requires replacement)
6	Check hoses, lines and fittings between control valve and tilt cylinder assemblies for oil leaks	No oil leaks	Notify direct support maintenance (control valve requires replacement)	Tighten fittings; replace leaking hoses (para 2-56f(1))

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Operational Test (cont).

STEP	PROCEDURE/ACTION	NORMAL INDICATION	IF INDICATION IS NORMAL	IF INDICATION IS ABNORMAL
7	Place tilt control lever in REAR position; release when mast is in full rearward position	Mast moves rearward smoothly	Proceed to step 8	Proceed to step 5
8	Place tilt control lever in FWD position; release lever when mast is in vertical position	–		
9	Place lift control lever in LOWER position; release when forks are touching ground	Mast moves downward smoothly	Proceed to step 10	Replace restrictor (para 2-56f(1))
10	Position vehicle to pick-up a 4000 pound load. Place lift control lever in RAISE position; release when mast is at full height. Allow mast to remain at full height for two minutes	Downward drift of mast shall not exceed one inch.	Proceed to step 11	Bleed air from lift cylinder assembly (para 2-56f(1), step 27)
11	Place lift control lever in LOWER position; release lever when forks are three feet from ground. Then place shift control lever in RIGHT position until forks are at extreme right position	Forks shift load to right smoothly	Proceed to step 14	Check sideshift chains and pulleys for wear or damage; replace as necessary (para 2-56e). Proceed to step 12
12	Place lift control lever in LOWER position until load is resting on ground. Disconnect fitting at rod end of sideshift cylinder assembly and plug fitting. Place shift control lever in RIGHT position and hold	No oil leakage at sideshift cylinder assembly port where fitting disconnected	Reconnect fitting to sideshift cylinder assembly. Proceed to step 13	Notify direct support maintenance (sideshift cylinder requires replacement)
13	Check hoses, lines and fittings between control valve and sideshift cylinder assembly for oil leaks	No oil leaks	Notify direct support maintenance (control valve requires replacement)	Tighten fittings; replace leaking hoses (para 2-56f)

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Operational Test (cont).

STEP	PROCEDURE/ACTION	NORMAL INDICATION	IF INDICATION IS NORMAL	IF INDICATION IS ABNORMAL
14	Place shift control lever in LEFT position until forks are at extreme left position	Forks shift load to left smoothly	Proceed to step 15	Check sideshift chains and pulleys for wear or damage; replace as necessary (para 2-56e)
15	Place lift control lever in LOWER position until load is resting on ground. Back vehicle away from load. Place lift control lever in RAISE position until forks are three feet from ground. Then, place rotate control lever in CW position until forks are rotated fully clockwise	Forks rotate clockwise smoothly	Proceed to step 18	Proceed to step 16 **NOTE** If binding or loud noise is heard, grease lubrication fitting on rotation bearing (refer to current lubrication order) and repeat this step. If above condition still exists, notify direct support maintenance (rotation bearing requires replacement)
16	With forks in extreme clockwise position, disconnect fitting at rod end of rotation cylinder and plug fitting. Place rotate control lever in CW position and hold	No oil leakage at rotation cylinder port where fitting disconnected	Reconnect fitting to rotation cylinder and proceed to step 17	Notify direct support maintenance (rotation cylinder requires replacement)
17	Check hoses, lines and fittings between control valve and rotation cylinder assembly for oil leaks	No oil leaks	Notify direct support maintenance (control valve requires replacement)	Tighten fittings; replace leaking hoses (para 2-56f)
18	Place rotate control lever in CCW position until forks are rotated fully counterclockwise	Forks rotate counterclockwise smoothly	Proceed to step 19	Proceed to step 16 **NOTE** If binding or loud noise is heard, grease lubrication fitting on rotation bearing (refer to current lubrication order) and repeat this step. If above condition still exists, notify direct support maintenance (rotation bearing requires replacement)
19	Turn engine off and check hydraulic reservoir oil level; add hydraulic oil if necessary (refer to current lubrication order)	–	Operational test complete	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Control Levers and Linkages.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Repair
e. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Bore Gage, zero to one inch range	

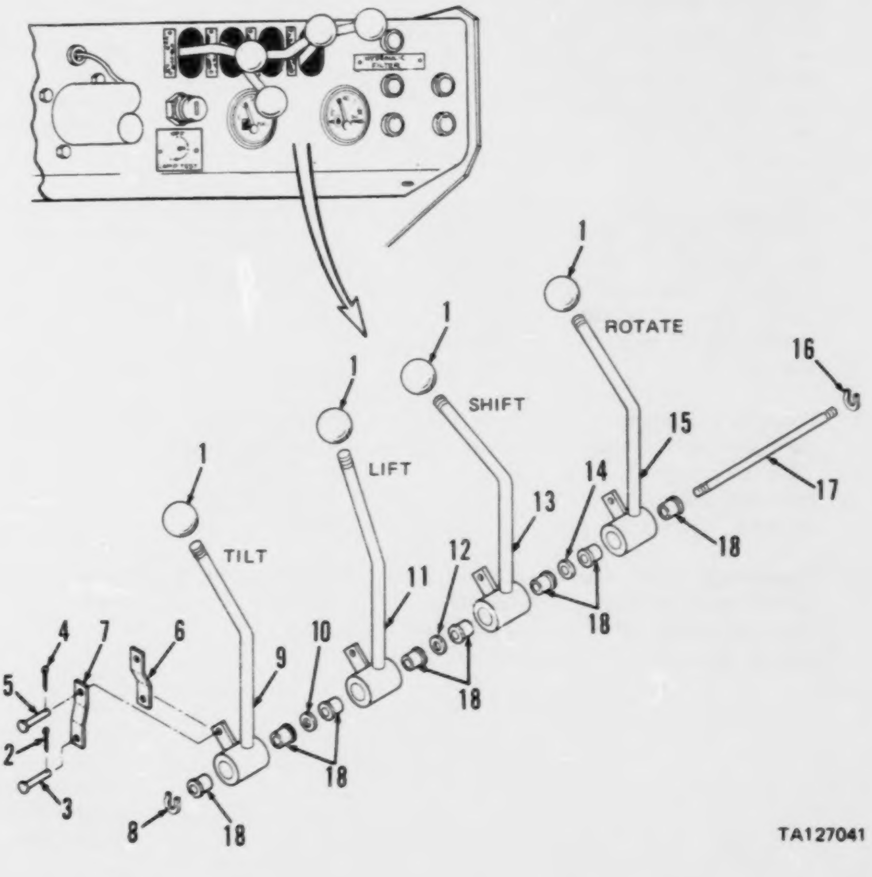
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Fine crocus cloth

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, forks lowered and resting on ground, mast vertical, engine off, and parking brake applied.
2-53h	Noise baffle mat removed.

KEY

1. Knobs
2. Cotter pins
3. Clevis pins
4. Cotter pins
5. Clevis pins
6. Valve links
7. Valve links
8. Retaining ring
9. Tilt control lever
10. Washer
11. Lift control lever
12. Washer
13. Shift control lever
14. Washer
15. Rotate control lever
16. Retaining ring
17. Pivot shaft
18. Bearings



TA127041

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Control Levers and Linkages (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, instrument panel, top	Four knobs (1)	Remove	Unscrew from levers
2	Operator's compartment, instrument panel, bottom	a. Four cotter pins (2)	Remove from control valve spools	
		b. Four clevis pins (3)	Remove	
		c. Assembled control levers	Remove as an assembly from bottom of instrument panel	Place on work bench
3	Assembled control levers	a. Four cotter pins (4)	Remove	
		b. Four clevis pins (5)	Remove	
		c. Eight valve links (6 and 7)	Remove	
		d. Retaining ring (8)	Remove	
		e. Tilt control lever (9)	Remove	
		f. Washer (10)	Remove	Used as required
		g. Lift control lever (11)	Remove	
		h. Washer (12)	Remove	Used as required
		i. Shift control lever (13)	Remove	
		j. Washer (14)	Remove	Used as required
		k. Rotate control lever (15)	Remove	
		l. Retaining ring (16)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		All parts	Clean	Use cleaning solvent P-D-680

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Control Levers and Linkages (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
5		Knobs (1)	Inspect	Replace if cracked, nicked, or internal threads damaged
6		Clevis pins (3 and 5)	Inspect	Replace if bent, cracked, or holes elongated
7		Valve links (6 and 7)	Inspect	Replace if bent, cracked, deformed, or mounting hole elongated
8		Retaining rings (8 and 16)	Inspect	Replace if cracked, damaged or spring action lost
9		Washers (10, 12 and 14)	Inspect	Replace if damaged or holes elongated
10		Pivot shaft (17)	Inspect	Replace if bent or damaged. Remove nicks or scratches with fine crocus cloth
11		Control levers (9, 11, 13, and 15)	Inspect	Replace if cracked or broken
12		Bearings (18)	Inspect	Use bore gage and measure inside diameter; replace (step 13 below) if inside diameter is greater than 0.690 inch
REPAIR				
13	Control lever (9, 11, 13, and 15)	a. Two bearings (18)	Remove	Use punch and drive out from opposite end
		b. Two bearings (18)	Install; position and tap into lever tube until shoulder just touches end of tube	Use soft hammer
INSTALLATION/REPLACEMENT				
14	Pivot shaft (17)	a. Retaining ring (16)	Install on one end of shaft (17)	
		b. Rotate control lever (15)	Install on shaft	
		c. Washer (14)	Install on shaft	Use as required to position control lever in instrument panel slot
		d. Shift control lever (13)	Install on shaft	
		e. Washer (12)	Install on shaft	Use as required to position control lever in instrument panel slot

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Control Levers and Linkages (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
14 (cont)		f. Lift control lever (11)	Install on shaft	
		g. Washer (10)	Install on shaft	Use as rquired to position control lever in instrument panel slot
		h. Tilt control lever (9)	Install on shaft	
		i. Retaining ring (8)	Install on shaft	
		j. Eight valve links (6 and 7)	Position on tab of levers	
		k. Four clevis pins (5)	Install	Secure valve links to tab on levers
		l. Four cotter pins (4)	Install and bend end over	Secure clevis pins
15	Operator's compartment, instrument panel, bottom	a. Assembled control levers	Position from beneath instrument panel	
		b. Four clevis pins (3)	Install in valve links and control valve spools	
		c. Four cotter pins (2)	Install in clevis pins and bend end over	
16	Operator's compartment, instrument panel, top	Four knobs (1)	Install	
17	Operator's compartment		a. Start engine and operate at idle speed b. Operate control levers and check that levers operate properly c. Turn engine off	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. *Lifting Forks.*

This task covers:
- a. Removal
- b. Installation/Replacement

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

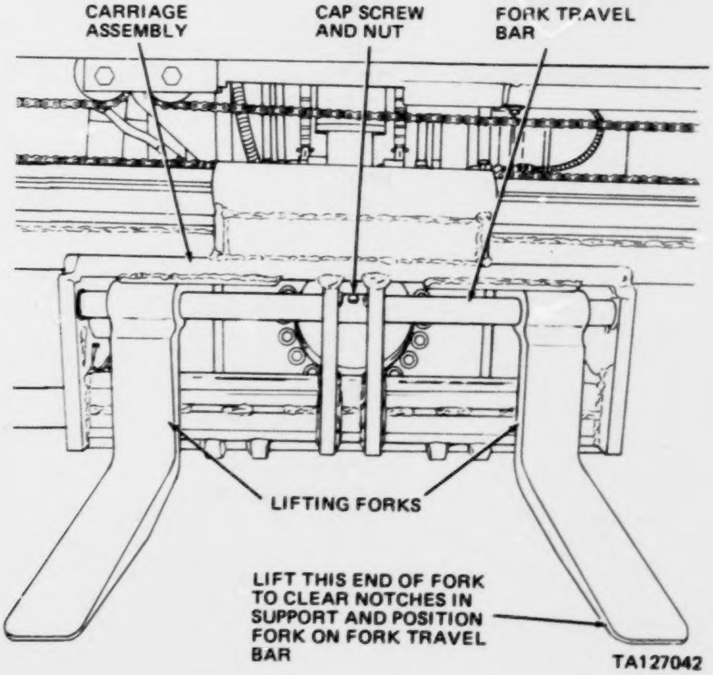
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Bar, 1-1/2 inch diameter by 18 inches long	
Hard Wooden Blocks (2), 6 by 6 by 30 inches	

MATERIALS/PARTS
Lifting forks

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, lifting forks raised waist high (approximately 3-1/2 feet from ground), carriage assembly blocked so it will not fall, engine off, parking brake applied, and placard placed on control valve levers indicating levers are not to be operated.
	Lifting forks positioned approximatley six inches from ends of carriage assembly.


CARRIAGE ASSEMBLY
CAP SCREW AND NUT
FORK TRAVEL BAR
LIFTING FORKS
LIFT THIS END OF FORK TO CLEAR NOTCHES IN SUPPORT AND POSITION FORK ON FORK TRAVEL BAR
TA127042

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Lifting Forks (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Carriage assembly, center	Cap screw and nut	Remove	
2	Carriage assembly, left side	Fork travel bar	Position	Use 1-1/2 inch diameter bar and hammer to drive bar far enough through bore on opposite side of carriage to remove fork
3	Carriage assembly, front	Lifting fork	Lift end of fork to disengage from notch in support and slide fork from bar	
4	Carriage assembly, right side	Fork travel bar	Same as step 2 above	
5	Carriage assembly, front	Lifting fork	Same as step 3 above	
INSTALLATION/REPLACEMENT				
6	Carriage assembly, front right	Lifting fork	Install on fork travel bar	If necessary perform step 2 above to position bar. Be sure you lift end of fork to clear notches in support
7	Carriage assembly, left side	Fork travel bar	Position	Use 1-1/2 inch diameter bar and hammer to drive bar into its bore on opposite side of carriage. Continue driving bar far enough through bore until remaining fork can be installed
8	Carriage assembly, left front	Lifting fork	Install on fork travel bar	Be sure you lift end of fork to clear notches in support
9	Carriage assembly, right side	Fork travel bar	Position	Drive bar into its bore on opposite side of carriage until holes in bar and center of carriage are aligned
10	Carriage assembly, middle	Cap screw and nut	Install	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Lift Chains and Pulleys.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Adjustment

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Sleeve, 13/16 inch diameter by 12 inches long	
Sleeve, 2-7/32 inches diameter by 12 inches long	
Arbor Press	
Bore Gage, 2 inches capacity	

MATERIALS/PARTS
- Cleaning solvent P-D-680
- Clean cloths
- SAE 10 motor oil

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, mast veritical, and forks resting on ground. Control valve control levers operated several times to relieve hydraulic pressure.

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

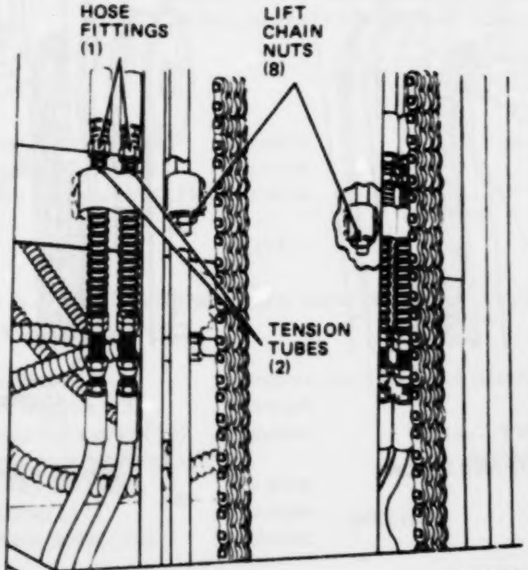
d. Lift Chains and Pulleys (cont).

REMOVAL

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

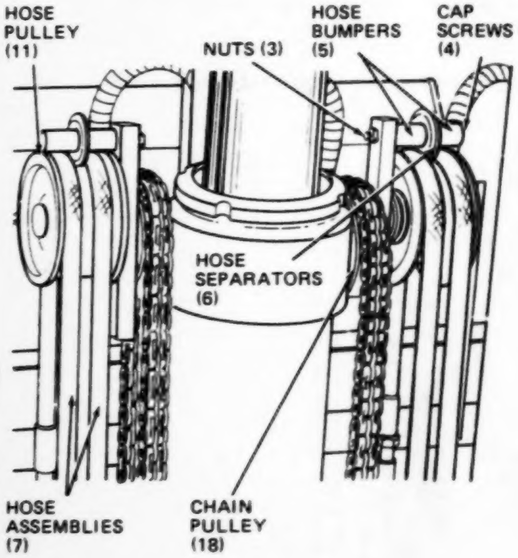
STEP	LOCATION	ITEM	ACTION	REMARKS
1	Mast assembly, inner mast	a. Four hose fittings (1)	Tag, clean, loosen, disconnect and cap	Use cleaning solvent P-D-680
		b. Four tension tubes (2)	Install 1/4-20 nuts	Hold tension tubes in position



2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

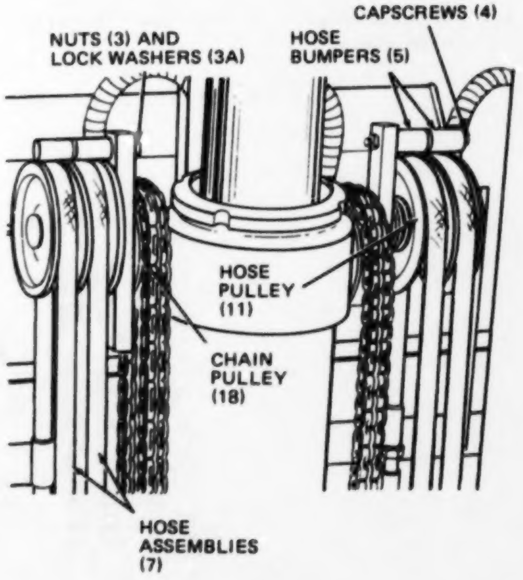
d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2	Lift cylinder assembly	a. Two nuts (3), lock washers (3A) and cap screws (4)	Remove	
		b. Four hose bumpers (5), and two hose separators (6)	Remove	Hose separators (6) used on serial number 9150572 and below
		c. Four hose assemblies (7)	Position out of way	
		d. Two lift chain nuts (8)	Slowly loosen and remove	
		e. Two lift chains (21)	Position out of way	


HOSE PULLEY (11)
NUTS (3)
HOSE BUMPERS (5)
CAP SCREWS (4)
HOSE SEPARATORS (6)
HOSE ASSEMBLIES (7)
CHAIN PULLEY (18)

SERIAL NUMBER 9150572 AND BELOW

TA127061


CAPSCREWS (4)
NUTS (3) AND LOCK WASHERS (3A)
HOSE BUMPERS (5)
HOSE PULLEY (11)
CHAIN PULLEY (18)
HOSE ASSEMBLIES (7)

SERIAL NUMBER 9150573 AND ABOVE

TA301525

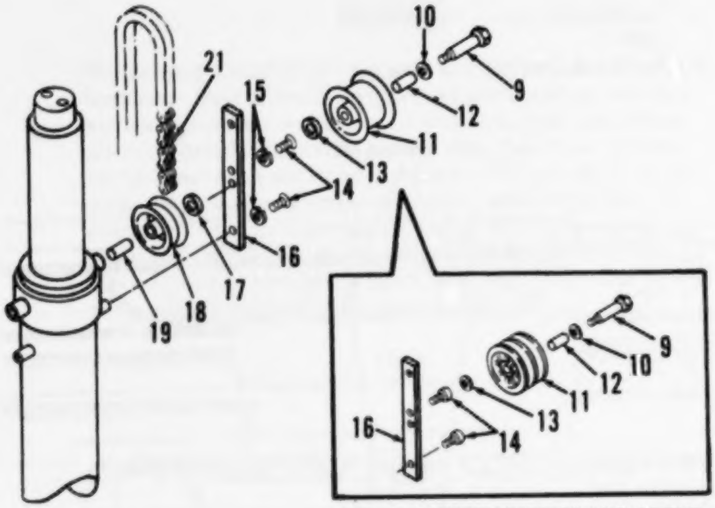
2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

2
(cont)



SERIAL NUMBER 9150573 AND ABOVE

TA301526

KEY

9. Step bolts
10. Washers
11. Hose pulleys
12. Bushings
13. Washers
14. Cap screws
15. Lock washers
16. Pulley bar
17. Washer
18. Chain pulley
19. Bearing
21. Lift chain

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Two step bolts (9)	Remove	
		g. Four washers (10)	Remove	
		h. Two hose pulleys (11)	Remove	

NOTE

Don't perform following step unless inspection indicates bushing (12) requires replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		i. Bushing (12)	Remove; use 13/16 inch diameter sleeve	
		j. Six washers (13)	Remove	
		k. Four cap screws (14) and lock washers (15)	Remove	Lock washers (15) used on serial number 9150572 and below
		l. Pulley bar (16)	Remove	
		m. Washer (17)	Remove	
		n. Chain pulley (18)	Remove	

NOTE

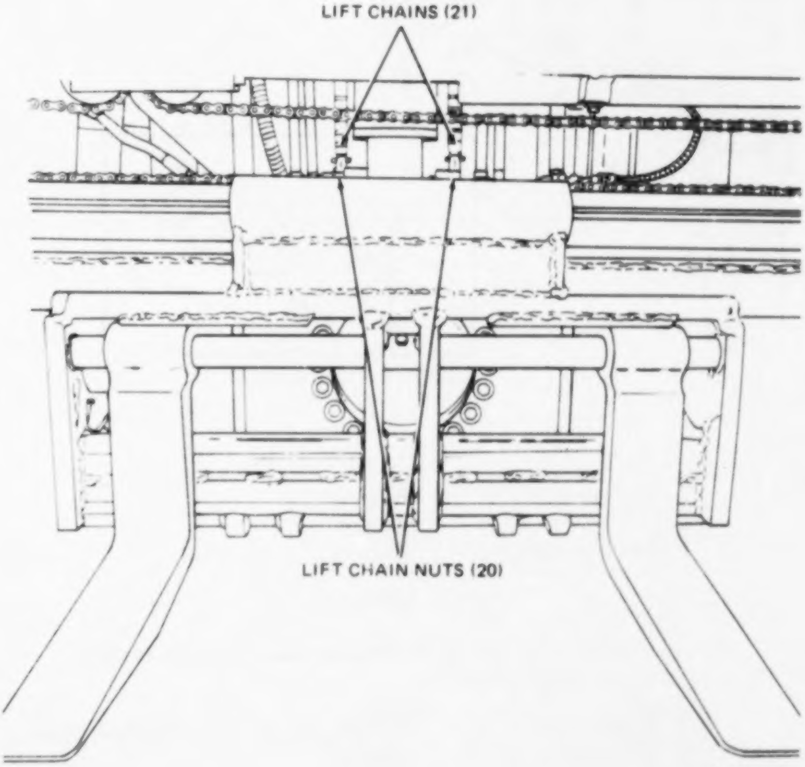
Don't perform following step unless inspection indicates bearing (19) requires replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		o. Bearing (19)	Remove; use 2-7/32 inch diameter sleeve	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3	Carriage bearing plate, top	a. Two lift chain nuts (20)	Remove	
		b. Two lift chains (21)	Remove	


LIFT CHAINS (21)
LIFT CHAIN NUTS (20)
TA127063

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
4		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
5		Hose bumpers (5)	Inspect	Replace if cracked, chipped or mounting hole enlarged
6		Step bolts (9)	Inspect	Replace if body is worn or cracked or if threads are damaged
7		Hose pulleys (11) and bushings (12)	Inspect	Replace as an assembly if pulley is cracked, bent or damaged. Replace bushing (12) (step 2i above) if inside diameter is 0.79 inch or more (use bore gage to measure)
8		Pulley bar (16)	Inspect	Replace if bent or cracked; chase outer threaded hole with 1/4-20 tap; chase inner threaded hole with 7/16-14 tap
9		Chain pulleys (18) and bearing (19)	Inspect	Replace as an assembly if pulley is cracked, bent or damaged. Replace bearing (19) (step 2o above) if rolling action is rough or if inside diameter is 1.24 inches or more (use bore gage to measure)

WARNING

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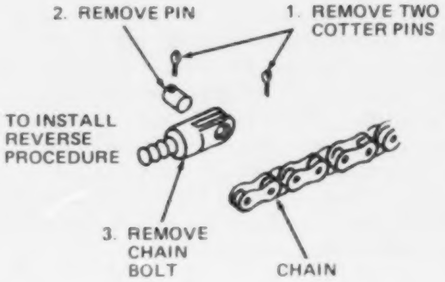
2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

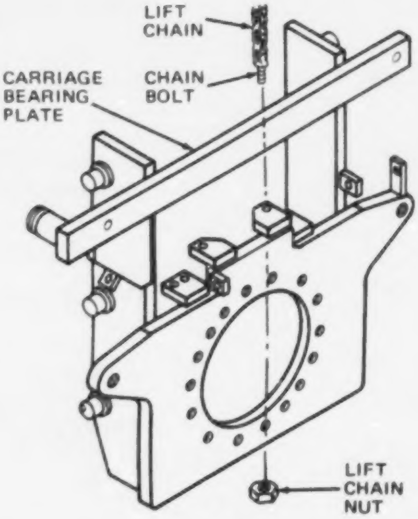
d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
10		Lift chains (21)	Inspect	Replace chain if any link is broken or cracked. Replace chain bolt if threads damaged; replace pin if cracked or bent. See illustration for replacement of these parts


2. REMOVE PIN
1. REMOVE TWO COTTER PINS
TO INSTALL REVERSE PROCEDURE
3. REMOVE CHAIN BOLT
CHAIN

TA127064

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
11	Carriage bearing plate, top	a. Two lift chains (21)	Soak chain in SAE 10 motor oil. Position, install chain bolt in carriage bracket supports	
		b. Two lift chain nuts (20)	Install	


LIFT CHAIN
CARRIAGE BEARING PLATE
CHAIN BOLT
LIFT CHAIN NUT

TA127065

STEP	LOCATION	ITEM	ACTION	REMARKS
12	Chain pulley (18)	Bearing (19)	Install; press into chain pulley hub until centered	Use 2-7/32 inch diameter sleeve
13	Hose pulley (11)	Bushing (12)	Install; press into hose pulley hub until centered	Use 13/16 inch diameter sleeve

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

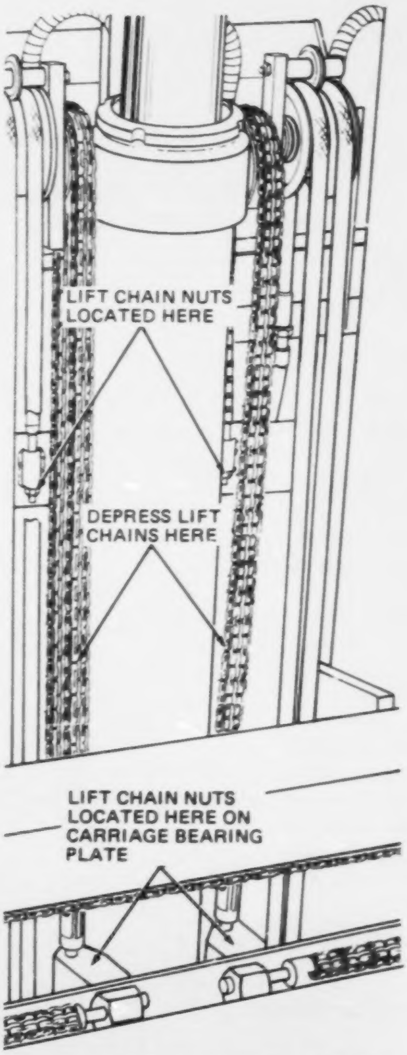
d. *Lift Chains and Pulleys (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
14	Lift cylinder assembly	a. Chain pulley (18)	Position	
		b. Lock washer (15) and cap screw (14)	Position in unthreaded center hole of pulley bar (16)	Lock washer (15) used on serial number 9150572 and below. Torque cap screw (14) to 25-35 foot pounds (serial number 9150573 and above)
		c. Washer (17)	Position on cap screw (14)	
		d. Pulley bar (16)	Install; cap screw (14) through chain pulley (18) hub	
		e. Lock washer (15) and cap screw (14)	Install	Lock washer (15) used on serial number 9150572 and below. Torque cap screw (14) to 25-35 foot pounds (serial number 9150573 and above)
		f. Lift chain (21)	Loop over chain pulley; install chain bolt in inner mast rod	
		g. Lift chain nuts (8)	Install; tighten until chain deflects 1/2 inch when depressed in middle	
		h. Two washers (10)	Position on step bolt (9)	
		i. Hose pulley (11)	Position on step bolt (9)	
		j. Three washers (13)	Position on step bolt (9)	
		k. Step bolt (9)	Install in center threaded hole of pulley bar (16)	
		l. Two hose assemblies (7)	Loop over hose pulley (11) and position near tension tubes (2)	
		m. Two tension tubes (2)	Remove 1/4-20 nuts	
		n. Hose fittings (1)	Remove cap, connect to tension tube and tighten	
		o. One hose bumper (5)	Position on cap screw (4)	
		p. Hose separator (6)	Position on cap screw (4)	Serial number 9150572 and below
		q. One hose bumper (5)	Position on cap screw (4)	
		r. Cap screw (4) and nut (3)	Install with hose separator (6) between two hose assemblies (7)	
			NOTE Repeat step 14 to install remaining chain and hose pulleys.	
15	Operator's compartment		Perform para 2-56f(2), step 12	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

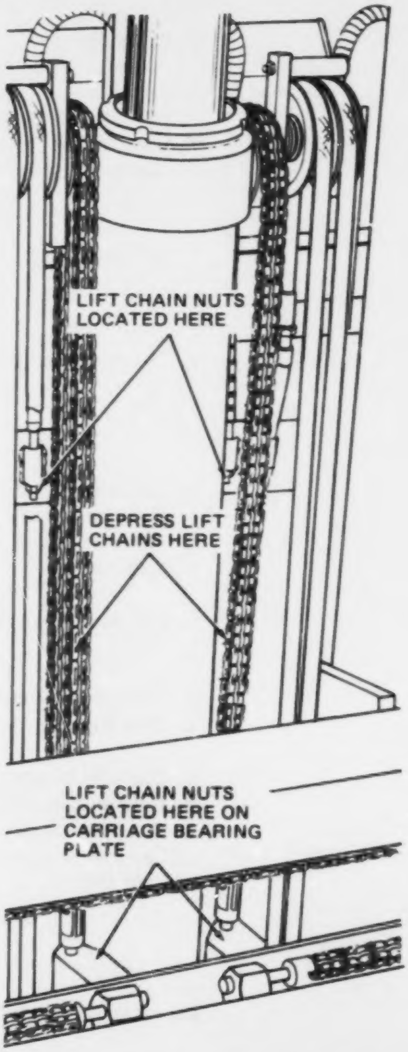
d. Lift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT				
16	Mast assembly	a. Lift chains	Depress in middle	Chain deflects 1/2 inch approximately
		b. Lift chain nut	Tighten or loosen as required to obtain 1/2 inch deflection when chain is depressed in middle.	


LIFT CHAIN NUTS LOCATED HERE
DEPRESS LIFT CHAINS HERE
LIFT CHAIN NUTS LOCATED HERE ON CARRIAGE BEARING PLATE

SERIAL NUMBER 9150572 AND BELOW

TA127066


LIFT CHAIN NUTS LOCATED HERE
DEPRESS LIFT CHAINS HERE
LIFT CHAIN NUTS LOCATED HERE ON CARRIAGE BEARING PLATE

SERIAL NUMBER 9150573 AND ABOVE

TA301527

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. *Sideshift Chains and Pulleys.*

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation/Replacement
- e. Adjustment

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Sleeve, 2-7/32 inch diameter by 12 inches long	
Arbor Press	
Bore Gage, 2 inch capacity	

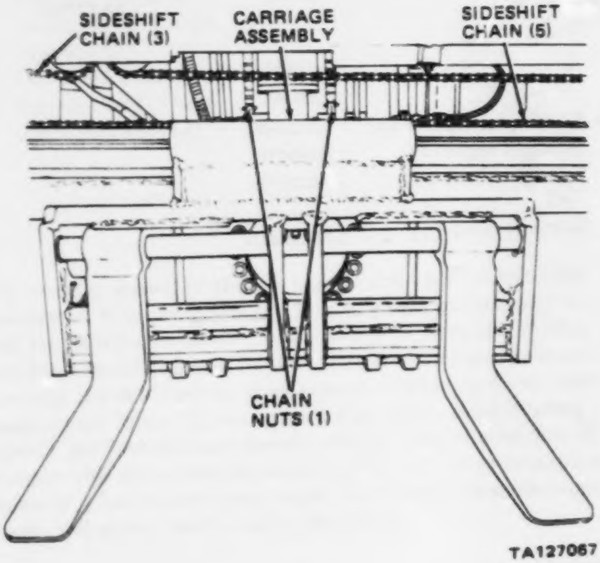
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
SAE 10 motor oil

EQUIPMENT CONDITION

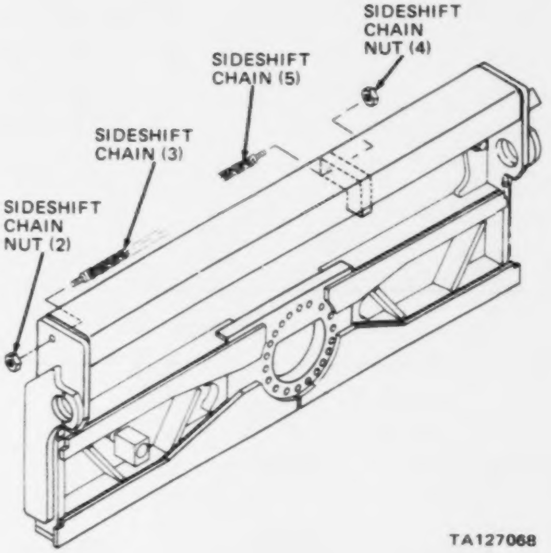
Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, mast vertical, and forks resting on ground.
	Control valve control levers operated several times to relieve hydraulic pressure.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Carriage assembly	Two sideshift chain nuts (1)	Remove	



2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

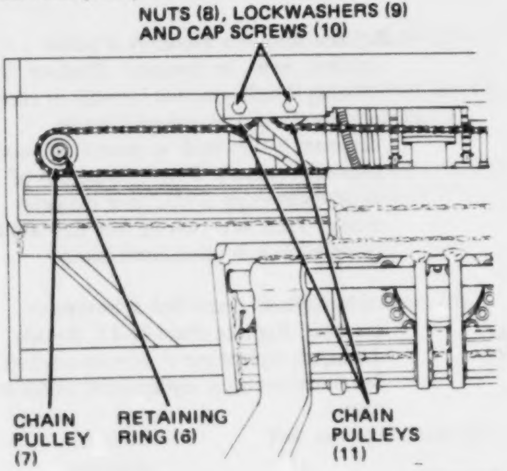
e. Sideshift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
		 SIDESHIFT CHAIN NUT (4) SIDESHIFT CHAIN (5) SIDESHIFT CHAIN (3) SIDESHIFT CHAIN NUT (2) TA127068		
2	Sideshift assembly	a. Sideshift chain nut (2)	Remove	
		b. Sideshift chain (3)	Remove	
		c. Sideshift chain nut (4)	Remove	
		d. Sideshift chain (5)	Remove	

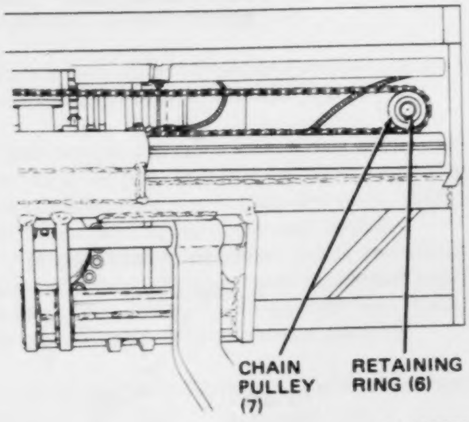
2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. *Sideshift Chains and Pulleys (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				

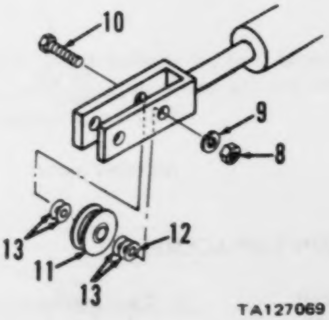

NUTS (8), LOCKWASHERS (9) AND CAP SCREWS (10)
CHAIN PULLEY (7)
RETAINING RING (6)
CHAIN PULLEYS (11)

TA127070


CHAIN PULLEY (7)
RETAINING RING (6)

TA127071

STEP	LOCATION	ITEM	ACTION	REMARKS
2 (cont)		e. Two retaining rings (6)	Remove	
		f. Two chain pulleys (7)	Remove	
		g. Two nuts (8), lock washers (9), and cap screws (10)	Remove	
		h. Two chain pulleys (11)	Remove	
		i. Two spacers (12) and eight washers (13)	Remove	


10
9
8
12
13
11
13

TA127069

CLEANING

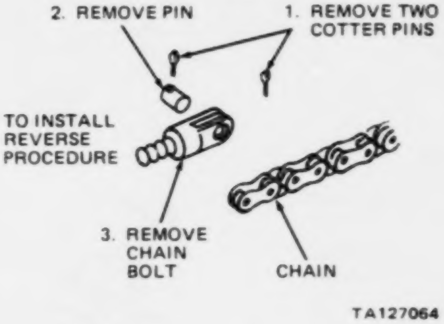
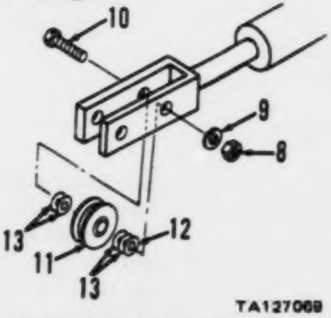
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		All parts	Clean	Use cleaning solvent P-D-680

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

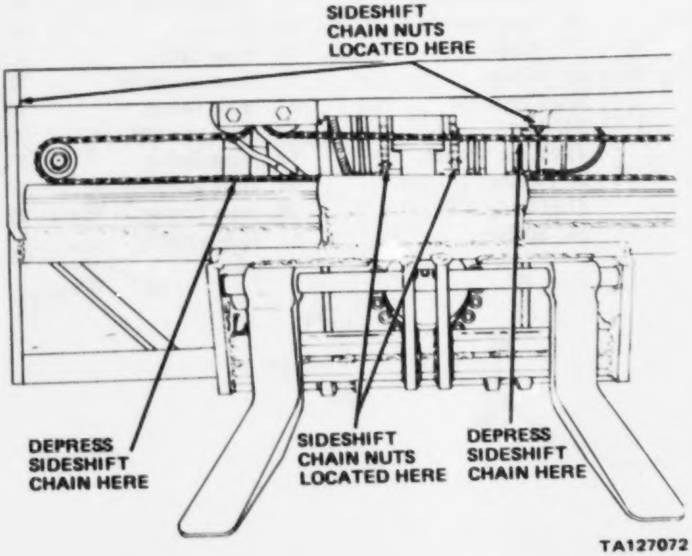
e. *Sideshift Chains and Pulleys (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
4		Chain pulleys (7 and 11)	Inspect	Replace complete assembly if pulley cracked, bent, or damaged. Replace bearing if rolling action is rough or race is chipped or damaged or if inside diameter is 0.79 inch or more (use bore gage to measure). Press bearing out of pulley hub using 2-7/32 inch diameter sleeve. Press new bearing into hub until centered in hub using same sleeve
5		Sideshift chains (3 and 5)  2. REMOVE PIN 1. REMOVE TWO COTTER PINS TO INSTALL REVERSE PROCEDURE 3. REMOVE CHAIN BOLT CHAIN TA127064	Inspect	Replace chains if any link is broken or cracked. Replace chain bolt if threads damaged; replace pin if bent or cracked. See illustration for replacement of these parts
6		All other parts	Inspect	Replace if cracked, bent or threads damaged  10 9 8 13 12 11 13 TA127069
INSTALLATION/REPLACEMENT				
7	Sideshift assembly	a. Two spacers (12) and eight washers (13)	Position as shown	
		b. Two chain pulleys (11)	Position	
		c. Two cap screws (10), lock washers (9), and nuts (8)	Install	
		d. Two chain pulleys (7)	Position on pulley supports	
		e. Two retaining rings (6)	Install	Be sure rings are seated in groove

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Sideshift Chains and Pulleys (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
7 (cont)		f. Sideshift chain (5)	Soak chain in SAE 10 motor oil, then position. Insert chain bolt in sideshift cylinder support hole	
		g. Sideshift chain nut (4)	Install	
		h. Sideshift chain (3)	Soak chain in SAE 10 motor oil, then position. Insert chain bolt in hole on right side of sideshift assembly	
		i. Sideshift chain nut (2)	Install	
		j. Sideshift chain (5)	Route chain around and down inner pulley mounted in sideshift cylinder rod fork, to pulley on left of sideshift assembly, around and down pulley to carriage assembly. Insert chain bolt in chain mounting lug on carriage assembly	
		k. Sideshift chain (3)	Route chain around and down outer pulley mounted in sideshift cylinder rod fork, to pulley on right of sideshift assembly around and down pulley to carriage assembly. Insert chain bolt in chain mounting lug on carriage assembly	
8	Carriage assembly	Two sideshift chain nuts (1)	Install; tighten until chain deflects 1/2 inch when depressed in middle	
ADJUSTMENT				
9	Carriage assembly	a. Sideshift chains	Depress in middle	Chain deflects 1/2 inch approximately
		b. Sideshift chain nuts	Tighten or loosen as required to obtain 1/2 inch deflection when chain is depressed in middle	


SIDESHIFT CHAIN NUTS LOCATED HERE
DEPRESS SIDESHIFT CHAIN HERE
SIDESHIFT CHAIN NUTS LOCATED HERE
DEPRESS SIDESHIFT CHAIN HERE
TA127072

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings.

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly. This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement
e. Bleeding air

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Hydraulic oil (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, mast tilted forward, forks resting on ground, engine off, and parking brake applied.
2-53c	Left side panel removed.
2-53h	Noise baffle mat removed.
	All control levers on control valve operated several times to relieve hydraulic pressure.

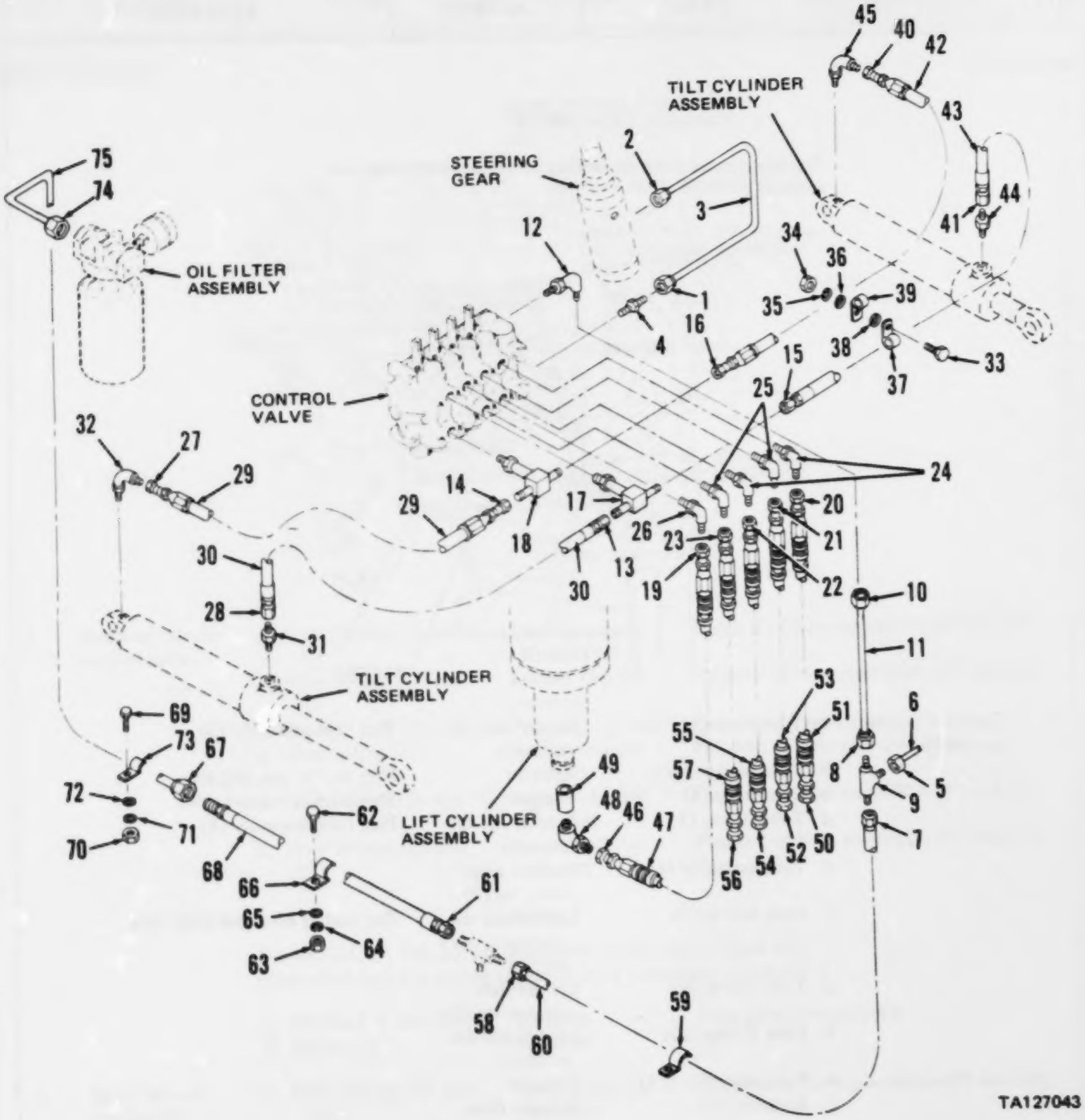
KEY

1. Tube fitting
2. Tube fitting
3. Tube assembly
4. Connector
5. Tube fitting
6. Tube assembly
7. Hose fitting
8. Tube fitting
9. Tee
10. Tube fitting
11. Tube assembly
12. Adapter
13. Hose fitting
14. Hose fitting
15. Hose fitting
16. Hose fitting
17. Tee
18. Tee
19. Hose fitting
20. Hose fitting
21. Hose fitting
22. Hose fitting
23. Hose fitting
24. Elbows
25. Elbows
26. Elbow
27. Hose fitting
28. Hose fitting
29. Hose assembly
30. Hose assembly
31. Adapter
32. Elbow
33. Cap screw
34. Nut
35. Lock washer
36. Washer
37. Clamp
38. Spacer
39. Clamp
40. Hose fitting
41. Hose fitting
42. Hose assembly
43. Hose assembly
44. Adapter
45. Elbow
46. Hose fitting
47. Hose assembly
48. Elbow
49. Restrictor
50. Hose fitting
51. Hose assembly
52. Hose fitting
53. Hose assembly
54. Hose fitting
55. Hose assembly
56. Hose fitting
57. Hose assembly
58. Hose fitting
59. Clamp
60. Hose assembly
61. Hose fitting
62. Cap screw
63. Nut
64. Lock washer
65. Washer
66. Clamp
67. Tube fitting
68. Hose assembly
69. Cap screw
70. Nut
71. Lock washer
72. Washer
73. Clamp
74. Tube fitting
75. Tube assembly

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).


45
40
42
TILT CYLINDER ASSEMBLY
43
44
41
2
STEERING GEAR
3
75
74
12
34
36
OIL FILTER ASSEMBLY
1
35
39
4
16
38
33
15
37
CONTROL VALVE
25
32
27
29
24
14
29
17
20
18
26
21
23
13
30
19
30
22
10
28
31
11
TILT CYLINDER ASSEMBLY
53
69
51
6
73
55
67
57
49
8
5
72
48
46
47
9
71
62
LIFT CYLINDER ASSEMBLY
7
70
68
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TA127043

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

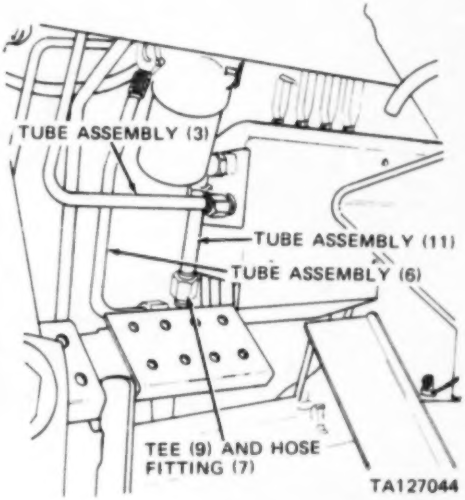
f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				

NOTE

Tag all hose and tube assemblies before disconnecting and removing.

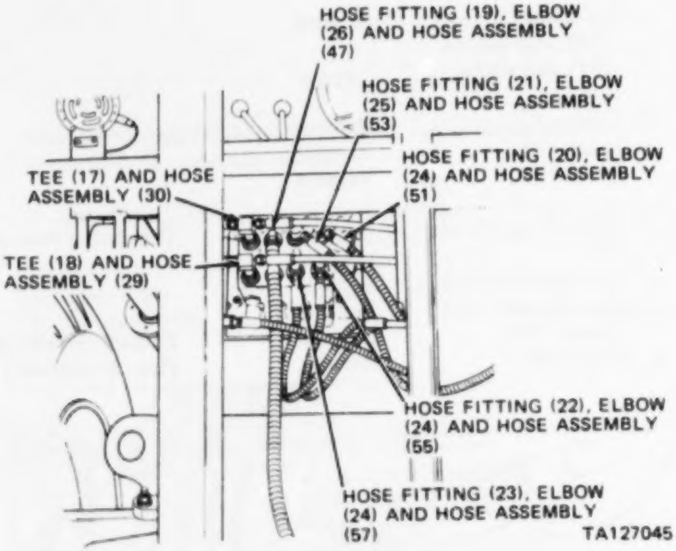


STEP	LOCATION	ITEM	ACTION	REMARKS
1	Operator's compartment	a. Tube fittings (1 and 2)	Loosen and disconnect	Plug tube assembly (3)
		b. Tube assembly (3)	Remove	Plug port in steering gear
		c. Connector (4)	Remove	Plug port in control valve
		d. Tube fitting (5)	Loosen and disconnect	Plug tube assembly (6)
		e. Tube assembly (6)	Position away from tee (9)	
		f. Hose fitting (7)	Loosen and disconnect from tee (9)	Plug end of hose assembly (60)
		g. Tube fitting (8)	Loosen then remove tee (9)	
		h. Tube fitting (10)	Loosen and disconnect	
		i. Tube assembly (11)	Remove	
		j. Adapter (12)	Remove from control valve	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

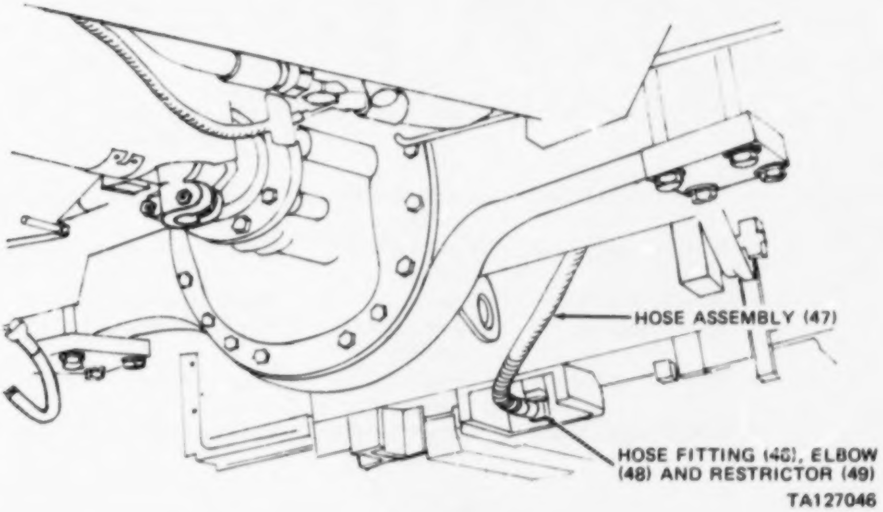
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
		 HOSE FITTING (19), ELBOW (26) AND HOSE ASSEMBLY (47) HOSE FITTING (21), ELBOW (25) AND HOSE ASSEMBLY (53) HOSE FITTING (20), ELBOW (24) AND HOSE ASSEMBLY (51) TEE (17) AND HOSE ASSEMBLY (30) TEE (18) AND HOSE ASSEMBLY (29) HOSE FITTING (22), ELBOW (24) AND HOSE ASSEMBLY (55) HOSE FITTING (23), ELBOW (24) AND HOSE ASSEMBLY (57) TA127045		
2	Front of vehicle, control valve	a. Hose fittings (13 and 14)	Loosen and disconnect	Plug end of hose assemblies (29 and 30)
		b. Hose fittings (15 and 16)	Loosen and disconnect	Plug end of hose assemblies (42 and 43)
		c. Tees (17 and 18)	Remove	Plug control valve ports
		d. Hose fitting (19)	Loosen and disconnect	Plug end of hose assembly (47)
		e. Hose fittings (20 and 21)	Loosen and disconnect	Plug end of hose assemblies (51 and 53)
		f. Hose fittings (22 and 23)	Loosen and disconnect	Plug end of hose assemblies (55 and 57)
		NOTE Elbows (24, 25, and 26) are adjustable; if necessary, loosen nut (part of elbow) and extend elbow to obtain clearance to remove it.		
		g. Elbows (24 and 25)	Remove	Plug control valve ports
		h. Elbow (26)	Remove	
3	Right side of vehicle; tilt cylinder assemblies	a. Hose fittings (27 and 28)	Loosen and disconnect	Plug end of hose assemblies (29 and 30)
		b. Hose assembly (29)	Remove	
		c. Hose assembly (30)	Remove	
		d. Adapter (31)	Remove	Plug tilt cylinder assembly port
		e. Elbow (32)	Remove	Plug tilt cylinder assembly port

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
4	Front of vehicle	a. Cap screw (33), nut (34), lock washer (35), and washer (36)	Remove	
		b. Clamp (37)	Remove	
		c. Spacer (38)	Remove	
		d. Clamp (39)	Remove	
5	Left side of vehicle, tilt cylinder assembly	a. Hose fittings (40 and 41)	Loosen and disconnect	Plug end of hose assemblies (42 and 43)
		b. Hose assembly (42)	Remove	
		c. Hose assembly (43)	Remove	
		d. Adapter (44)	Remove	Plug tilt cylinder assembly port
		e. Elbow (45)	Remove	Plug tilt cylinder assembly port

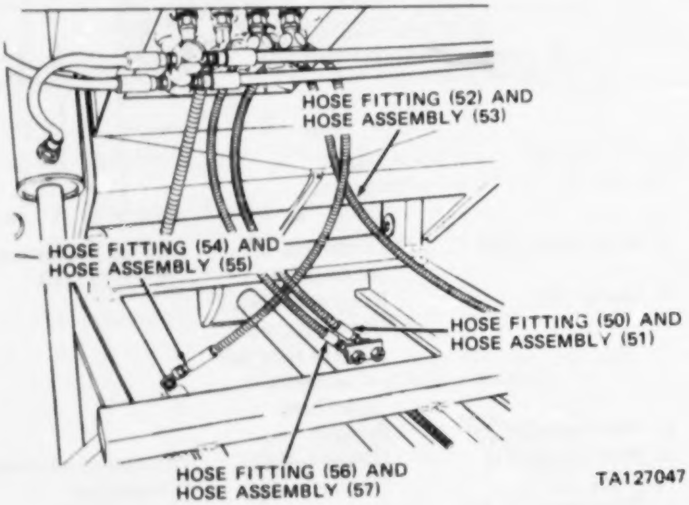


STEP	LOCATION	ITEM	ACTION	REMARKS
6	Mast assembly, lift cylinder assembly bottom	a. 12 gallon container	Place under hose fitting (46)	Drain hydraulic oil into

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

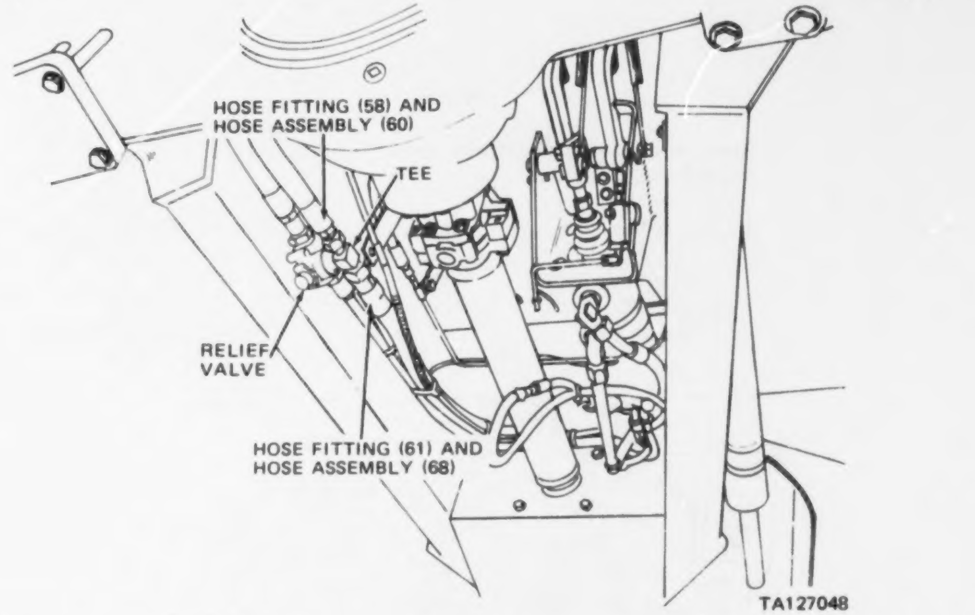
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
6 (cont)		**NOTE** When performing following step, slowly loosen fitting (46) to relieve hydraulic pressure slowly.		
		b. Hose fitting (46)	Loosen and dis-connect	Plug end of hose assembly (47)
		c. Hose assembly (47)	Remove	
		d. Elbow (48)	Remove	
		e. Restrictor (49)	Remove	Plug lift cylinder assembly port
		 HOSE FITTING (52) AND HOSE ASSEMBLY (53) HOSE FITTING (54) AND HOSE ASSEMBLY (55) HOSE FITTING (50) AND HOSE ASSEMBLY (51) HOSE FITTING (56) AND HOSE ASSEMBLY (57) TA127047		
7	Mast assembly, outer mast	a. Hose fitting (50)	Loosen and dis-connect	Plug end of hose assembly (51)
		b. Hose assembly (51)	Remove	Plug outer mast port
		c. Hose fitting (52)	Loosen and dis-connect	Plug end of hose assembly (53)
		d. Hose assembly (53)	Remove	Plug outer mast port
		e. Hose fitting (54)	Loosen and dis-connect	Plug end of hose assembly (55)
		f. Hose assembly (55)	Remove	Plug outer mast port
		g. Hose fitting (56)	Loosen and dis-connect	Plug end of hose assembly (57)
		h. Hose assembly (57)	Remove	Plug outer mast port

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

REMOVAL (cont)


HOSE FITTING (58) AND
HOSE ASSEMBLY (60)
TEE
RELIEF
VALVE
HOSE FITTING (61) AND
HOSE ASSEMBLY (68)
TA127048

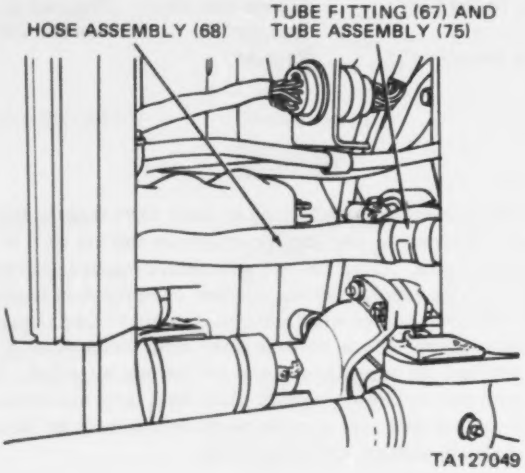
STEP	LOCATION	ITEM	ACTION	REMARKS
8	Front chassis bottom right side	a. Hose fitting (58)	Loosen and disconnect	Plug tee connection and end of hose assembly (60)
		b. Clamp (59)	Remove hardware securing clamp (59) to right side of accelerator pivot base	
		c. Hose assembly (60)	Remove	
		d. Hose fitting (61)	Loosen and disconnect	Plug end of hose assembly (68) and tee connection
		e. Cap screw (62), nut (63), lock washer (64), and washer (65)	Remove	
		f. Clamp (66)	Remove	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

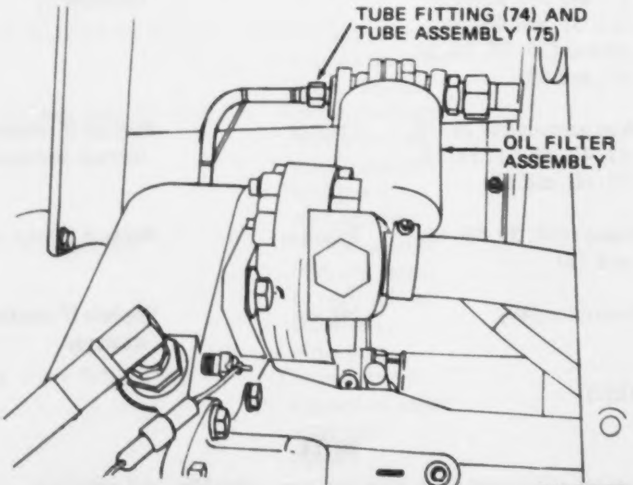
f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				


HOSE ASSEMBLY (68)
TUBE FITTING (67) AND TUBE ASSEMBLY (75)
TA127049

STEP	LOCATION	ITEM	ACTION	REMARKS
9	Rear chassis, front	a. Tube fitting (67)	Loosen and disconnect	Plug end of tube and hose assemblies (75 and 68)
		b. Hose assembly (68)	Remove	
		c. Cap screw (69), nut (70), lock washer (71), and washer (72)	Remove	
		d. Clamp (73)	Remove	


TUBE FITTING (74) AND TUBE ASSEMBLY (75)
OIL FILTER ASSEMBLY
TA127050

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
10	Engine compartment, front	a. Tube fitting (74)	Loosen and disconnect	Plug end of tube assembly (75) and port on oil filter assembly
		b. Tube assembly (75)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
11		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
12		Tube assemblies (3, 6, 11, and 75)	Inspect	Replace if cracked, kinked, dented, twisted, or fitting threads damaged
13		Connector (4), tees (9, 17, and 18), adapters (12, 31, and 44), and elbows (24, 25, 26, 32, 45, and 48)	Inspect	Replace if cracked, distorted, or threads damaged
14		Hose assemblies (29, 30, 42, 43, 47, 51, 53, 55, 57, 60, and 68)	Inspect	Replace if cracked, split, or fitting threads damaged
15		Clamps (37, 39, 59, 66, and 73)	Inspect	Replace if bent or cracked
16		Restrictor (49)	Inspect	Replace if cracked, damaged, or threads damaged
INSTALLATION/REPLACEMENT				

NOTE

Remove plugs/caps from tube and hose assemblies and cylinders as connections are made.

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
17	Engine compartment, front	a. Tube assembly (75)	Position between oil filter head and front of rear chassis	
		b. Tube fitting (74)	Connect to oil filter head and tighten	
18	Rear chassis, front	a. Clamp (73)	Position on tube assembly (75)	
		b. Cap screw (69)	Install	Secures clamp (73) to chassis
		c. Washer (72), lock washer (71), and nut (70)	Install	Secures screw and clamp to chassis
		d. Hose assembly (68)	Position between tube assembly (75) and tee located on relief valve	
		e. Tube fitting (67)	Connect to hose (68) and tighten	
19	Front chassis, bottom right side	a. Clamp (66)	Position on hose assembly (68)	
		b. Cap screw (62)	Install	Secures clamp (66) to chassis
		c. Washer (65), lock washer (64), and nut (63)	Install	Secures screw and clamp to chassis
		d. Hose fitting (61)	Connect to tee located on relief valve. Tighten	
		e. Hose assembly (60)	Position between tee located on relief valve and operator's compartment	
		f. Clamp (59)	Position on hose (60) and secure to right side of accelerator pivot base	
		g. Hose fitting (58)	Connect to tee located on relief valve and tighten	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
20	Mast assembly, outer mast	a. Hose assembly (57)	Position	
		b. Hose fitting (56)	Connect to fitting on outer mast, left side and tighten	
		c. Hose assembly (55)	Position	
		d. Hose fitting (54)	Connect to fitting on outer mast, center mounting bracket, right side and tighten	
		e. Hose assembly (53)	Position	
		f. Hose fitting (52)	Connect to fitting on outer mast, right side and tighten	
		g. Hose assembly (51)	Position	
		h. Hose fitting (50)	Connect to fitting on outer mast, center mounting bracket, left side and tighten	
21	Mast assembly, lift cylinder assembly, bottom	a. Restrictor (49)	Install in lift cylinder port	
		b. Elbow (48)	Install	
		c. Hose assembly (47)	Position	
		d. Hose fitting (46)	Connect to elbow (48) and tighten	
22	Left side of vehicle, tilt cylinder assembly	a. Elbow (45)	Install	
		b. Adapter (44)	Install	
		c. Hose assembly (43)	Position between cylinder and control valve	
		d. Hose fitting (41)	Connect to adapter (44) and tighten	
		e. Hose assembly (42)	Position between cylinder and control valve	
		f. Hose fitting (40)	Connect to elbow (45) and tighten	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
23	Front of vehicle	a. Clamp (39)	Position on hose (42)	
		b. Clamp (37)	Position on hose (43) and place on cap screw (33)	
		c. Spacer (38)	Install on cap screw (33)	
		d. Clamp (39)	Install on cap screw (33)	
		e. Cap screw (33)	Position	Secures clamps (37 and 39) and spacer (38)
		f. Washer (36), lock washer (35), and nut (34)	Install	
24	Right side of vehicle, tilt cylinder assembly	a. Elbow (32)	Install	
		b. Adapter (31)	Install	
		c. Hose assembly (30)	Position between cylinder and control valve	
		d. Hose fitting (28)	Connect to adapter (31) and tighten	
		e. Hose assembly (29)	Position between cylinder and control valve	
		f. Hose fitting (27)	Connect to elbow (32) and tighten	
25	Front of vehicle, control valve	a. Elbow (26)	Install	
		b. Elbows (25 and 24)	Install	
		NOTE Elbows (24, 25, and 26) are adjustable; if necessary, loosen nut (part of elbow) and extend or compress elbow as required to install it. After installation be sure you tighten elbow nut to prevent hydraulic oil leakage.		
		c. Hose fittings (23 and 22)	Connect and tighten	
		d. Hose fittings (21 and 20)	Connect and tighten	
		e. Hose fitting (19)	Connect and tighten	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
25 (cont)		f. Tees (17 and 18)	Install	
		g. Hose fittings (16 and 15)	Connect and tighten	
		h. Hose fittings (14 and 13)	Connect and tighten	
26	Operator's compartment	a. Adapter (12)	Install in control valve	
		b. Tube assembly (11)	Position	
		c. Tube fitting (10)	Connect to adapter (12) and tighten	
		d. Tee (9)	Connect to fitting (8) and tighten fitting	
		e. Hose fitting (7)	Connect to tee and tighten	Fitting (7) part of hose assembly (60)
		f. Tube assembly (6)	Position	
		g. Tube fitting (5)	Connect to tee (9) and tighten	
		h. Connector (4)	Install in control valve	
		i. Tube assembly (3)	Position between control valve and steering gear	
		j. Tube fitting (2)	Connect to steering gear and tighten	
		k. Tube fitting (1)	Connect to connector (4) and tighten	
BLEEDING AIR FROM LIFT CYLINDER ASSEMBLY				
27	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate control valve levers (lift, rotate, shift, and tilt control levers) several times c. Operate engine at idle speed and check for oil leaks at connections. Tighten fittings if necessary d. Turn engine off e. Check hydraulic oil reservoir oil level; add oil if necessary (refer to current lubrication order) f. Start engine, operate at idle speed, and operate lift control lever to raise forks five feet from ground. Turn engine off	

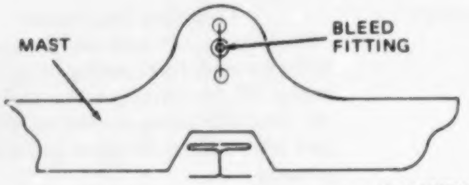
2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(1) Hydraulic Oil Filter Assembly to Control Valve to Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

BLEEDING AIR FROM LIFT CYLINDER ASSEMBLY (cont)



WARNING

When performing following step, don't look directly down at bleed fitting; hydraulic oil is under pressure and may cause serious injury.

g. Mount carriage assembly and slowly open bleed fitting located at top of lift cylinder assembly to bleed air; when carriage assembly almost touches ground, close bleed fitting

h. Repeat steps e, f, and g, until all air is expelled from lift cylinder assembly

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly. This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

APPLICABLE SERIAL NUMBERS
9150572 and below

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, mast tilted forward, forks resting on ground, engine off, and parking brake applied. All control levers on control valve operated several times to relieve hydraulic pressure.

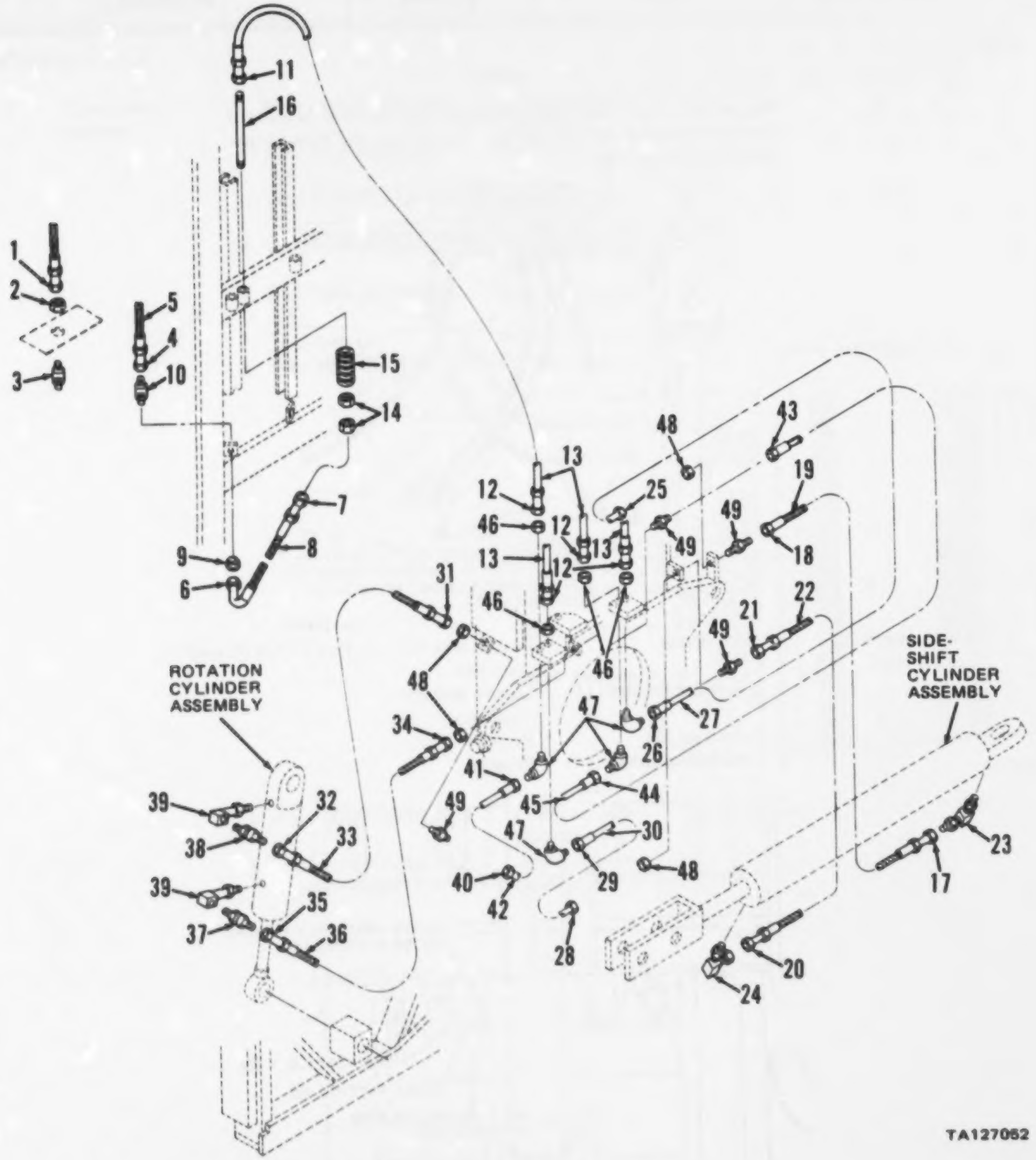
KEY

1. Hose fittings
2. Nuts
3. Elbow fittings
4. Hose fittings
5. Hose assemblies
6. Hose fittings
7. Hose fittings
8. Hose assemblies
9. Nuts
10. Elbow fittings
11. Hose fittings
12. Hose fittings
13. Hose assemblies
14. Nuts
15. Hose springs
16. Tension tubes
17. Hose fitting
18. Hose fitting
19. Hose assembly
20. Hose fitting
21. Hose fitting
22. Hose assembly
23. Elbow fitting
24. Elbow fitting
25. Tube fitting
26. Tube fitting
27. Tube assembly
28. Tube fitting
29. Tube fitting
30. Tube assembly
31. Hose fitting
32. Hose fitting
33. Hose assembly
34. Hose fitting
35. Hose fitting
36. Hose assembly
37. 45 degree fitting
38. 90 degree fitting
39. 90 degree fittings
40. Tube fitting
41. Tube fitting
42. Tube assembly
43. Tube fitting
44. Tube fitting
45. Tube assembly
46. Nuts
47. Elbow fittings
48. Nuts
49. Fittings

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).



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ROTATION CYLINDER ASSEMBLY
SIDE-SHIFT CYLINDER ASSEMBLY

TA127052

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

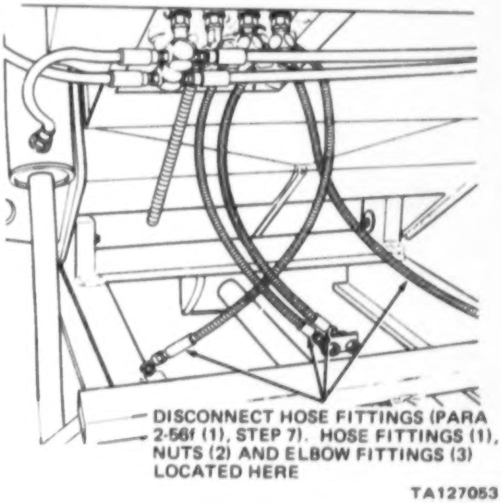
f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

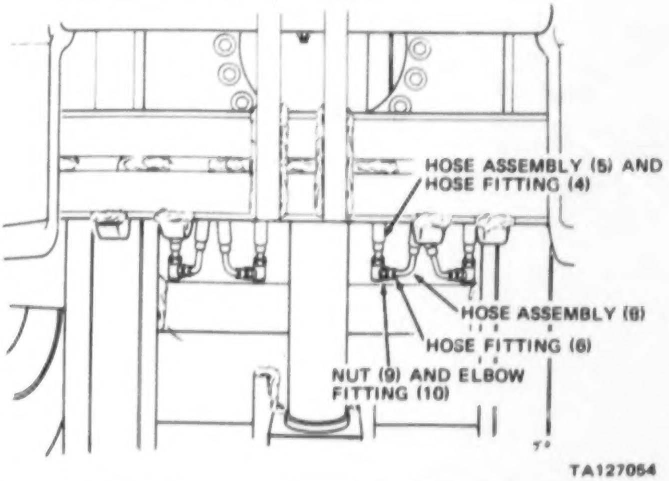
REMOVAL

NOTE

Plug or cap all tube and hose assemblies after removal to prevent entry of dirt/other foreign matter. Tag all hose and tube assemblies before removing.


DISCONNECT HOSE FITTINGS (PARA 2-56f (1), STEP 7). HOSE FITTINGS (1), NUTS (2) AND ELBOW FITTINGS (3) LOCATED HERE
TA127053

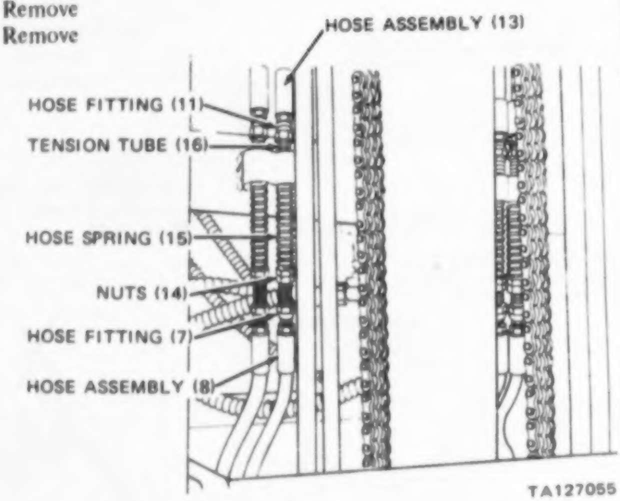
STEP	LOCATION	ITEM	ACTION	REMARKS
1	Mast assembly, outer mast	a. Hose fitting	Loosen and disconnect	Para 2-56d(1), step 7
		b. Four hose fittings (1)	Loosen and disconnect	
		c. Four nuts (2)	Remove	
		d. Four elbow fittings (3)	Remove	


HOSE ASSEMBLY (5) AND HOSE FITTING (4)
HOSE ASSEMBLY (8)
HOSE FITTING (6)
NUT (9) AND ELBOW FITTING (10)
TA127054

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

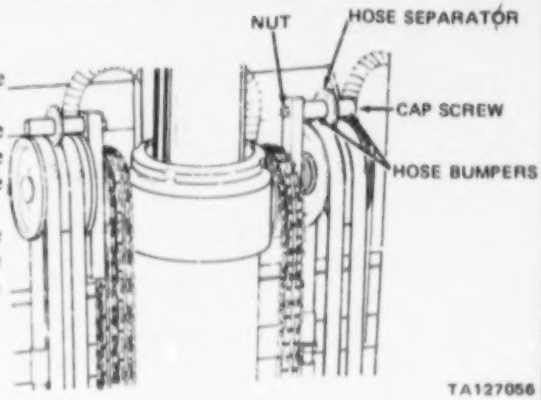
(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2	Inner mast, bottom	a. Four hose fittings (4)	Loosen and disconnect	
		b. Four hose assemblies (5)	Remove	
		c. Four hose fittings (6)	Loosen and disconnect	
		d. Four hose fittings (7)	Loosen and disconnect	
		e. Four hose assemblies (8)	Remove	
		f. Four nuts (9)	Remove	
		g. Four elbow fittings (10)	Remove	 HOSE ASSEMBLY (13) HOSE FITTING (11) TENSION TUBE (16) HOSE SPRING (15) NUTS (14) HOSE FITTING (7) HOSE ASSEMBLY (8) TA127055
		h. Four hose fittings (11)	Loosen and disconnect	
		i. Four hose fittings (12) (page 2-431)	Loosen and disconnect	

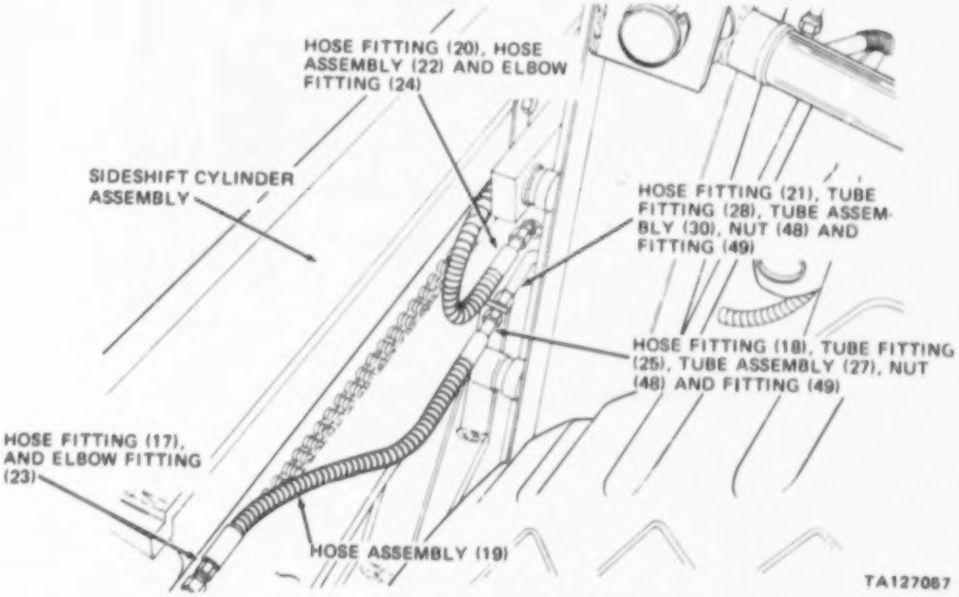
2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2 (cont)		j. Two cap screws and nuts	Remove	
		k. Four hose bumpers	Remove	
		l. Two hose separators	Remove	
		m. Four hose assemblies (13)	Remove	
		n. Eight nuts (14)	Remove	
		o. Four hose springs (15)	Remove	
		p. Four tension tubes (16)	Remove	

NUT
HOSE SEPARATOR
CAP SCREW
HOSE BUMPERS
TA127056

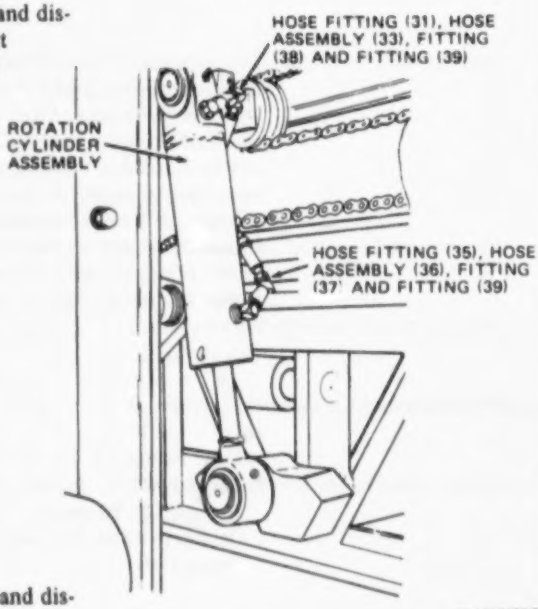


HOSE FITTING (20), HOSE ASSEMBLY (22) AND ELBOW FITTING (24)
SIDESHIFT CYLINDER ASSEMBLY
HOSE FITTING (21), TUBE FITTING (28), TUBE ASSEMBLY (30), NUT (48) AND FITTING (49)
HOSE FITTING (18), TUBE FITTING (25), TUBE ASSEMBLY (27), NUT (48) AND FITTING (49)
HOSE FITTING (17), AND ELBOW FITTING (23)
HOSE ASSEMBLY (19)
TA127057

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3	Carriage assembly	a. Hose fitting (17 and 18)	Loosen and disconnect	
		b. Hose assembly (19)	Remove	
		c. Hose fitting (20 and 21)	Loosen and disconnect	
		d. Hose assembly (22)	Remove	
		e. Elbow fitting (23 and 24)	Remove	
		f. Tube fittings (25 and 26)	Loosen and disconnect	
		g. Tube assembly (27)	Remove	
		h. Tube fittings (28 and 29)	Loosen and disconnect	
		i. Tube assembly (30)	Remove	 HOSE FITTING (31), HOSE ASSEMBLY (33), FITTING (38) AND FITTING (39) ROTATION CYLINDER ASSEMBLY HOSE FITTING (35), HOSE ASSEMBLY (36), FITTING (37) AND FITTING (39) TA127058
		j. Hose fittings (31 and 32)	Loosen and disconnect	
		k. Hose assembly (33)	Remove	
		l. Hose fittings (34 and 35)	Loosen and disconnect	
		m. Hose assembly (36)	Remove	
		n. 45 degree fitting (37)	Remove	
		o. 90 degree fitting (38)	Remove	
		p. Two 90 degree fittings (39)	Remove	
		q. Tube fittings (40 and 41)	Loosen and disconnect	
		r. Tube assembly (42)	Remove	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3 (cont)		s. Tube fittings (43 and 44)	Loosen and disconnect	
		t. Tube assembly (45)	Remove	
		u. Four nuts (46)	Remove	
		v. Four elbow fittings (47)	Remove	
		w. Four nuts (48)	Remove	
		x. Four fittings (49)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
4		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
5		Elbow fittings (3, 10, 23, 24, and 47), 45 degree fitting (37), 90 degree fittings (38 and 39), and fitting (49)	Inspect	Replace if cracked, distorted, or threads damaged
6		Hose assemblies (5, 8, 13, 22, 33, and 36)	Inspect	Replace if cracked, split, or fitting threads damaged
7		Tube assemblies (27, 30, 42, and 45), and tension tubes (16)	Inspect	Replace if cracked, kinked, dented, twisted, or fitting threads damaged
8		Hose springs (15)	Inspect	Replace if cracked or damaged or evidence of permanent set is obvious

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

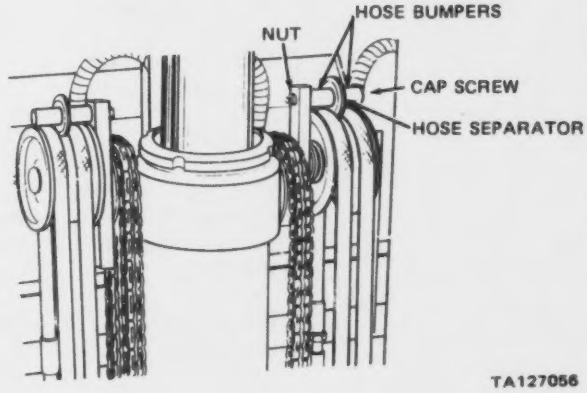
STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
		NOTE Remove plugs/caps from tube and hose assemblies and cylinders as connections are made.		
9	Carriage assembly	a. Four fittings (49)	Position	
		b. Four nuts (48)	Install	Secure fittings (49)
		c. Four elbow fittings (47)	Position	
		d. Four nuts (46)	Install	Secure elbow fittings (47)
		e. Tube assembly (45)	Position	
		f. Tube fittings (44 and 43)	Connect and tighten	Completes installation of tube assembly (45)
		g. Tube assembly (42)	Position	
		h. Tube fittings (41 and 40)	Connect and tighten	Completes installation of tube assembly (42)
		i. Two 90 degree fittings (39)	Install	
		j. 90 degree fitting (38)	Install	
		k. 45 degree fitting (37)	Install	
		l. Hose assembly (36)	Position	
		m. Hose fittings (35 and 34)	Connect and tighten	Completes installation of hose assembly (36)
		n. Hose assembly (33)	Position	
		o. Hose fittings (32 and 31)	Connect and tighten	Completes installation of hose assembly (33)
		p. Tube assembly (30)	Position	
		q. Tube fittings (29 and 28)	Connect and tighten	Completes installation of tube assembly (30)
		r. Tube assembly (27)	Position	
		s. Tube fittings (26 and 25)	Connect and tighten	Completes installation of tube assembly (27)
		t. Elbow fittings (24 and 23)	Install	
		u. Hose assembly (22)	Position	
		v. Hose fittings (21 and 20)	Connect and tighten	Completes installation of hose assembly (22)
		w. Hose assembly (19)	Position	
		x. Hose fittings (18 and 17)	Connect and tighten	Completes installation of hose assembly (19)

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont)

(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
10	Inner mast, bottom	a. Tension tube (16)	Position with short threaded end towards fitting (11)	
		b. Hose spring (15)	Position on tension tube (16)	
		c. Nuts (14)	Install	
		d. Hose assembly (13)	Position	



STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Hose bumper and hose separator	Position on cap screw	
		f. Cap screw and nut	Install; position hose assemblies (13) on each side of separator	
		g. Hose fitting (11)	Connect and tighten	
		h. Hose fitting (12)	Connect and tighten	Completes installation of hose assembly (13)
		i. Elbow fitting (10)	Position	
		j. Nut (9)	Install	Secure elbow fitting (10)
		k. Hose assembly (8)	Position	
		l. Hose fittings (7 and 6)	Connect and tighten	Completes installation of hose assembly (8)
		m. Hose assembly (5)	Position	
		n. Hose fitting (4)	Connect and tighten	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(2) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
11	Mast assembly, outer mast	a. Elbow fitting (3)	Position	
		b. Nut (2)	Install	
		c. Hose fitting (1)	Connect and tighten	Completes installation of hose assembly (5)
		f. Hose fitting	Connect and tighten	Para 2-56f(1), step 20
12	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate control valve levers (lift, rotate, shift, and tilt control levers) several times c. Operate engine at idle speed and check for oil leaks at connections. Tighten fittings if necessary d. Turn engine off e. Check hydraulic reservoir oil level; add oil if necessary (refer to current lubrication order) f. Repeat steps a through e	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

APPLICABLE SERIAL NUMBERS
9150573 and above

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, mast tilted forward, forks resting on ground, engine off, and parking brake applied. All control levers on control valve operated several times to relieve hydraulic pressure.

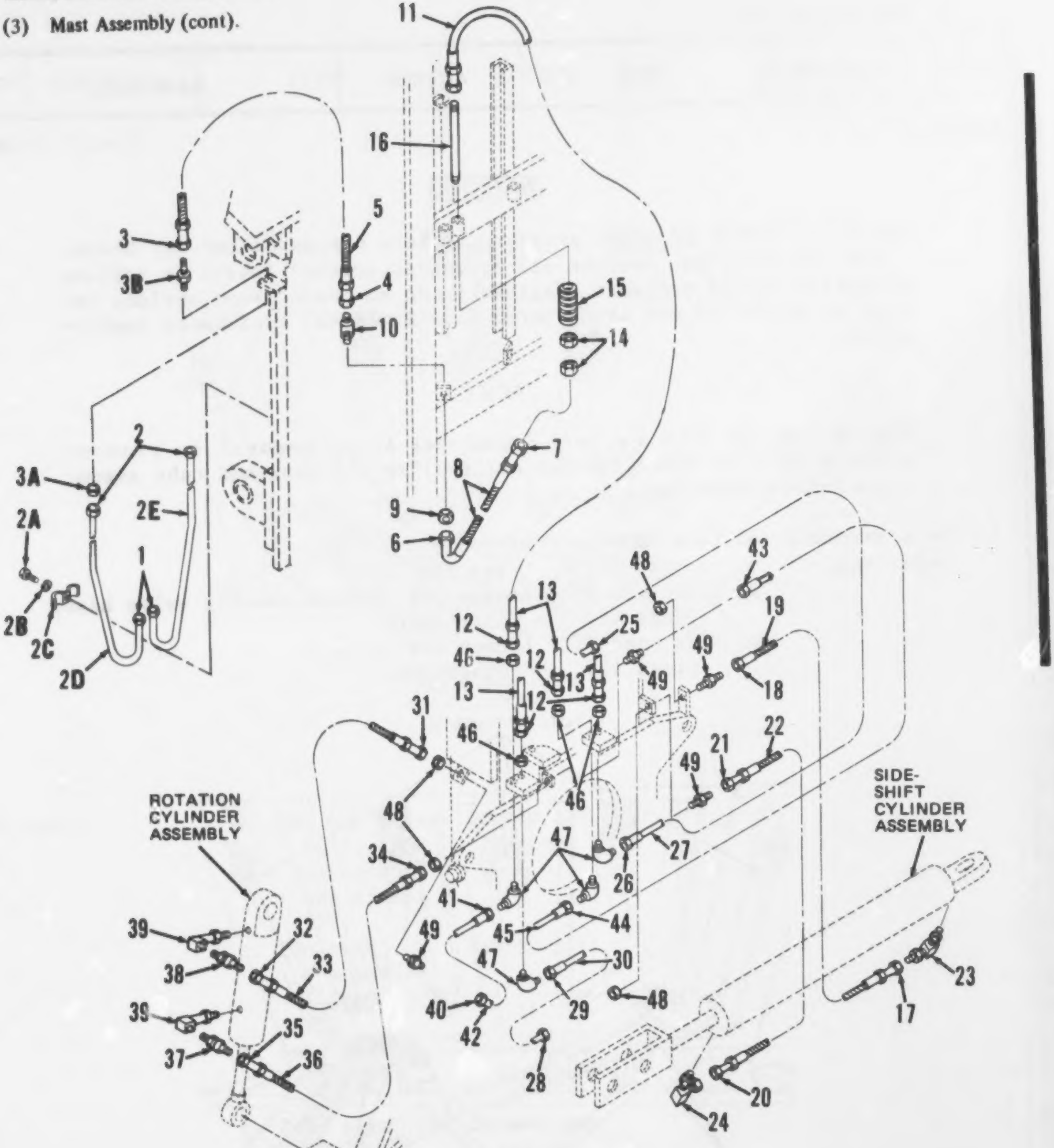
KEY

1. Tube fittings
2. Tube fittings
2A. Cap screws
2B. Lock washers
2C. Clamps
2D. Tube assemblies
2E. Tube assemblies
3. Hose fittings
3A. Nuts
3B. Fittings
4. Hose fittings
5. Hose assemblies
6. Hose fittings
7. Hose fittings
8. Hose assemblies
9. Nuts
10. Elbow fittings
11. Hose fittings
12. Hose fittings
13. Hose assemblies
14. Nuts
15. Hose springs
16. Tension tubes
17. Hose fitting
18. Hose fitting
19. Hose assembly
20. Hose fitting
21. Hose fitting
22. Hose assembly
23. Elbow fitting
24. Elbow fitting
25. Tube fitting
26. Tube fitting
27. Tube assembly
28. Tube fitting
29. Tube fitting
30. Tube assembly
31. Hose fitting
32. Hose fitting
33. Hose assembly
34. Hose fitting
35. Hose fitting
36. Hose assembly
37. 45 degree fitting
38. 90 degree fitting
39. 90 degree fittings
40. Tube fitting
41. Tube fitting
42. Tube assembly
43. Tube fitting
44. Tube fitting
45. Tube assembly
46. Nuts
47. Elbow fittings
48. Nuts
49. Fittings

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).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SIDE-
SHIFT
CYLINDER
ASSEMBLY
ROTATION
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TA301528

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

REMOVAL

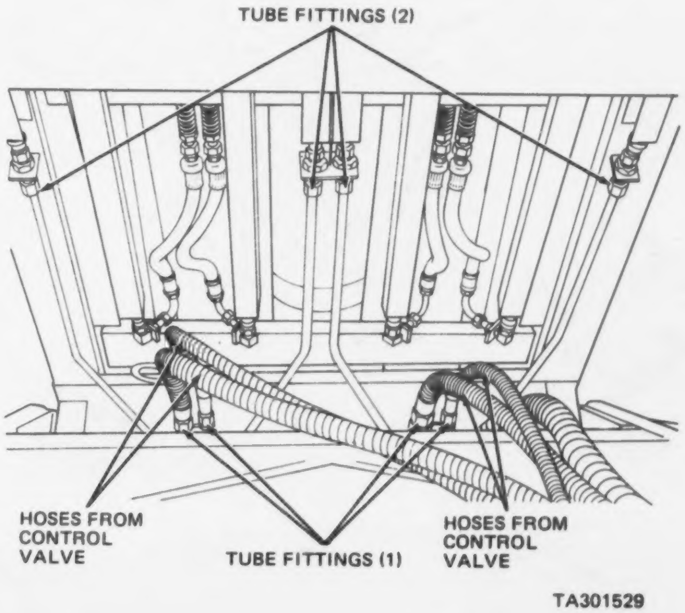
WARNING

Hydraulic system is under pressure. Before disconnecting any hoses, lines, or fittings, operate all hydraulic control levers to relieve hydraulic system pressure. Failure to do so could cause serious injury or death. If you are injured obtain medical assistance immediately.

NOTE

Plug or cap all tube and hose assemblies after removal to prevent entry of dirt or other foreign matter. Tag all hose and tube assemblies before removing.

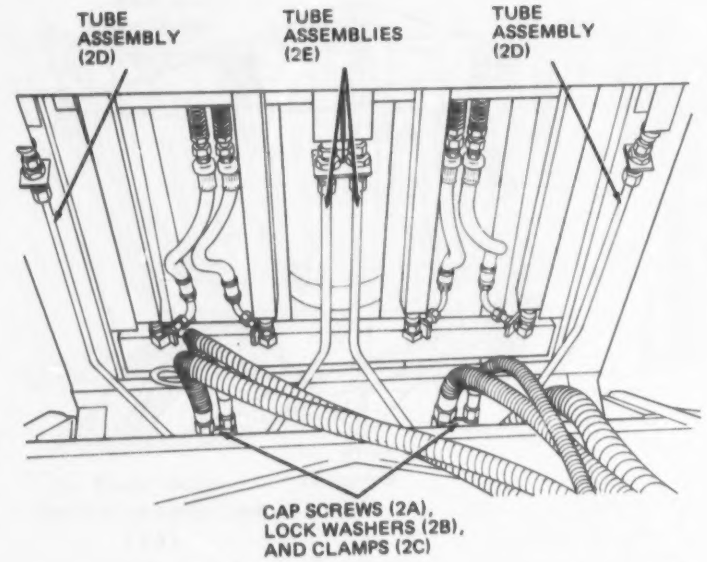
STEP	LOCATION	ITEM	ACTION	REMARKS
1	Mast assembly, outer mast	a. Four hoses	Identify and tag	
		b. Four tube fittings (1)	Loosen and disconnect	From control valve hoses
		c. Four tube fittings (2)	Loosen and disconnect	


TUBE FITTINGS (2)
HOSES FROM CONTROL VALVE
TUBE FITTINGS (1)
HOSES FROM CONTROL VALVE
TA301529

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

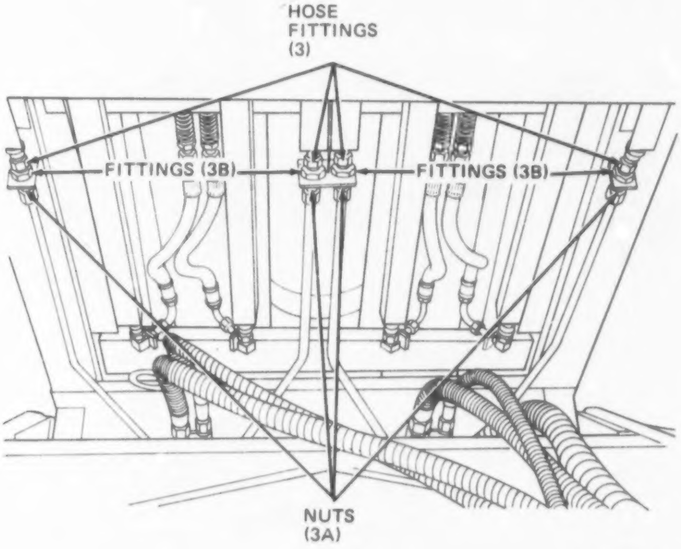
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
 TUBE ASSEMBLY (2D) TUBE ASSEMBLIES (2E) TUBE ASSEMBLY (2D) CAP SCREWS (2A), LOCK WASHERS (2B), AND CLAMPS (2C) TA301530				
1 (cont)		d. Two cap screws (2A), lock washers (2B) and clamps (2C)	Loosen and remove	
		e. Two tube assemblies (2D and 2E)	Remove	
		f. Four hose fittings (3)	Loosen and disconnect	
		g. Four nuts (3A)	Loosen and remove	
		h. Four fittings (3B)	Remove	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

REMOVAL (cont)



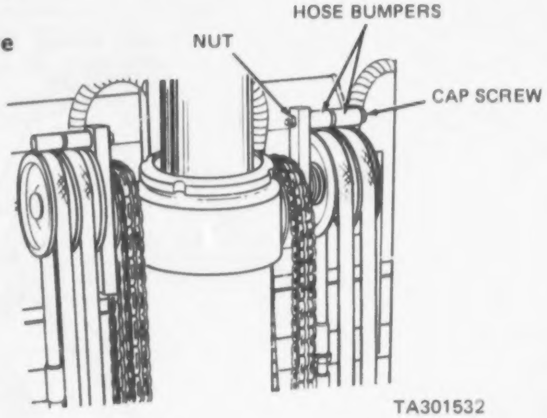
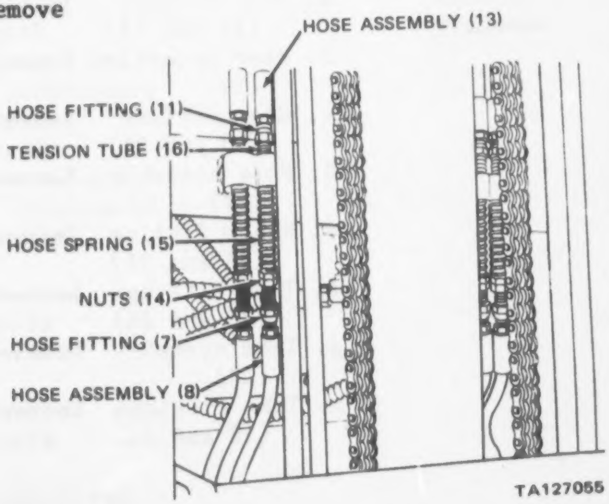
TA301531

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Inner mast, bottom	a. Four hose fittings (4)	Loosen and disconnect	
		b. Four hose assemblies (5)	Remove	
		c. Four hose fittings (6)	Loosen and disconnect	
		d. Four hose fittings (7)	Loosen and disconnect	
		e. Four hose assemblies (8)	Remove	
		f. Four nuts (9)	Remove	
		g. Four elbow fittings (10)	Remove	
		h. Four hose fittings (11)	Loosen and disconnect	
		i. Four hose fittings (12) (page 2-431)	Loosen and disconnect	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

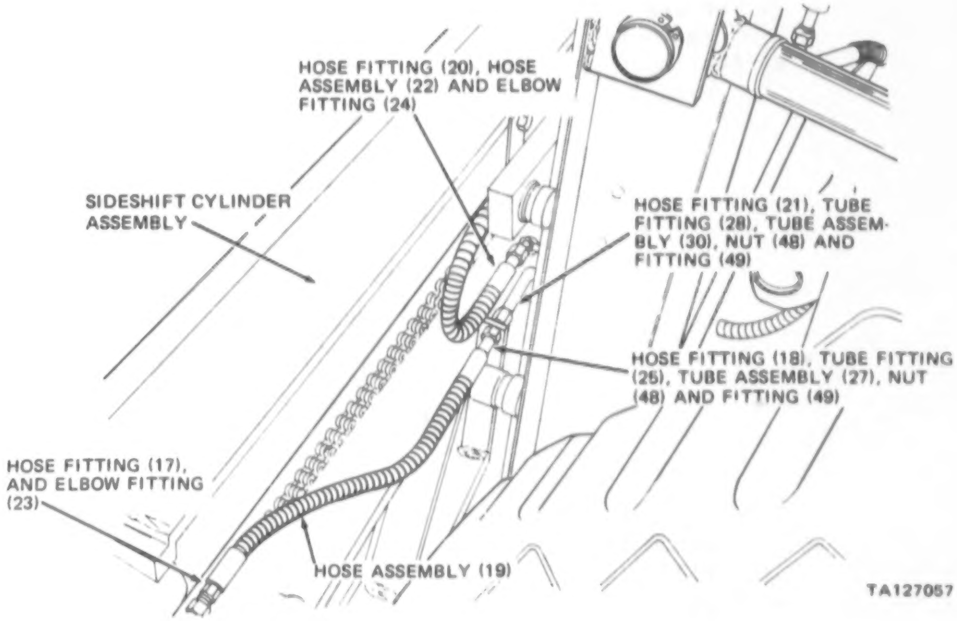
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2 (cont)		j. Two cap screws and nuts	Remove	
		k. Four hose bumpers	Remove	 HOSE BUMPERS NUT CAP SCREW TA301532
		l. Four hose assemblies (13)	Remove	
		m. Eight nuts (14)	Remove	
		n. Four hose springs (15)	Remove	
		o. Four tension tubes (16)	Remove	 HOSE ASSEMBLY (13) HOSE FITTING (11) TENSION TUBE (16) HOSE SPRING (15) NUTS (14) HOSE FITTING (7) HOSE ASSEMBLY (8) TA127055

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				

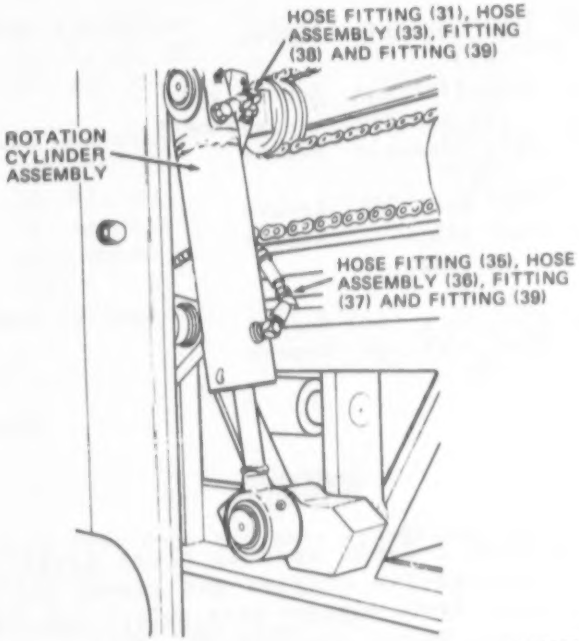

HOSE FITTING (20), HOSE ASSEMBLY (22) AND ELBOW FITTING (24)
SIDESHIFT CYLINDER ASSEMBLY
HOSE FITTING (21), TUBE FITTING (28), TUBE ASSEMBLY (30), NUT (48) AND FITTING (49)
HOSE FITTING (18), TUBE FITTING (25), TUBE ASSEMBLY (27), NUT (48) AND FITTING (49)
HOSE FITTING (17), AND ELBOW FITTING (23)
HOSE ASSEMBLY (19)
TA127057

3	Carriage assembly	a. Hose fitting (17 and 18)	Loosen and disconnect	
		b. Hose assembly (19)	Remove	
		c. Hose fitting (20 and 21)	Loosen and disconnect	
		d. Hose assembly (22)	Remove	
		e. Elbow fitting (23 and 24)	Remove	
		f. Tube fittings (25 and 26)	Loosen and disconnect	
		g. Tube assembly (27)	Remove	
		h. Tube fittings (28 and 29)	Loosen and disconnect	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
		 HOSE FITTING (31), HOSE ASSEMBLY (33), FITTING (38) AND FITTING (39) ROTATION CYLINDER ASSEMBLY HOSE FITTING (35), HOSE ASSEMBLY (36), FITTING (37) AND FITTING (39) TA127058		
3 (cont)		i. Tube assembly (30)	Remove	
		j. Hose fittings (31 and 32)	Loosen and disconnect	
		k. Hose assembly (33)	Remove	
		l. Hose fittings (34 and 35)	Loosen and disconnect	
		m. Hose assembly (36)	Remove	
		n. 45 degree fitting (37)	Remove	
		o. 90 degree fitting (38)	Remove	
		p. Two 90 degree fittings (39)	Remove	
		q. Tube fittings (40 and 41)	Loosen and disconnect	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3 (cont)		r. Tube assembly (42)	Remove	
		s. Tube fittings (43 and 44)	Loosen and disconnect	
		t. Tube assembly (45)	Remove	
		u. Four nuts (46)	Remove	
		v. Four elbow fittings (47)	Remove	
		w. Four nuts (48)	Remove	
		x. Four fittings (49)	Remove	
CLEANING				
WARNING Dry cleaning solvent P-D-680 used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air and medical attention immediately. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water and get medical aid immediately.				
4		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
5		Elbow fittings (3, 10, 23, 24, and 47), 45 degree fitting (37), 90 degree fittings (38 and 39), and fitting (3B and 49)	Inspect	Replace if cracked, distorted, or threads damaged

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
6		Hose assemblies (5, 8, 13, 22, 33, and 36)	Inspect	Replace if cracked, split, or fitting threads damaged
7		Tube assemblies (2D, 2E, 27, 30, 42, and 45) and tension tubes (16)	Inspect	Replace if cracked, kinked, dented, twisted, or fitting threads damaged
8		Hose springs (15)	Inspect	Replace if cracked or damaged or evidence of permanent set is obvious
INSTALLATION/REPLACEMENT				
NOTE Remove plugs/caps from tube and hose assemblies and cylinders as connections are made.				
9	Carriage assembly	a. Four fittings (49)	Position	
		b. Four nuts (48)	Install	Secure fittings (49)
		c. Four elbow fittings (47)	Position	
		d. Four nuts (46)	Install	Secure elbow fittings (47)
		e. Tube assembly (45)	Position	
		f. Tube fittings (44 and 43)	Connect and tighten	Completes installation of tube assembly (45)
		g. Tube assembly (42)	Position	
		h. Tube fittings (41 and 40)	Connect and tighten	Completes installation of tube assembly (42)
		i. Two 90 degree fittings (39)	Install	

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2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

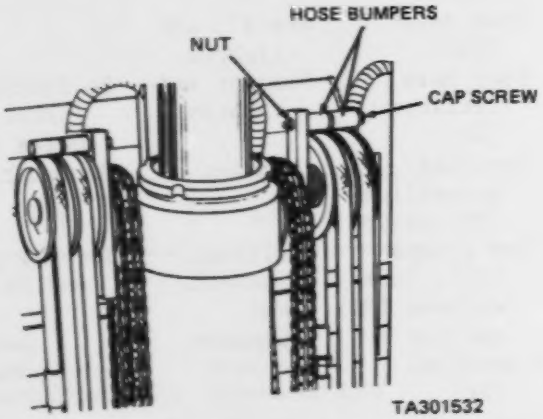
(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
9 (cont)		j. 90 degree fitting (38)	Install	
		k. 45 degree fitting (37)	Install	
		l. Hose assembly (36)	Position	
		m. Hose fittings (35 and 34)	Connect and tighten	Completes installation of hose assembly (36)
		n. Hose assembly (33)	Position	
		o. Hose fittings (32 and 31)	Connect and tighten	Completes installation of hose assembly (33)
		p. Tube assembly (30)	Position	
		q. Tube fittings (29 and 28)	Connect and tighten	Completes installation of tube assembly (30)
		r. Tube assembly (27)	Position	
		s. Tube fittings (26 and 25)	Connect and tighten	Completes installation of tube assembly (27)
		t. Elbow fittings (24 and 23)	Install	
		u. Hose assembly (22)	Position	
		v. Hose fittings (21 and 20)	Connect and tighten	Completes installation of hose assembly (22)
		w. Hose assembly (19)	Position	
		x. Hose assembly (18 and 17)	Connect and tighten	Completes installation of hose assembly (19)
10	Inner mast, bottom	a. Tension tube (16)	Position with short threaded end towards fitting (11)	
		b. Hose spring (15)	Position on tension tube (16)	
		c. Nuts (14)	Install	
		d. Hose assembly (13)	Position	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).



STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
10 (cont)		e. Hose bumper	Position on cap screw	
		f. Cap screw and nut	Install; position hose assemblies (13) in each pulley groove	
		g. Hose fitting (11)	Connect and tighten	
		h. Hose fitting (12)	Connect and tighten	Completes installation of hose assembly (13)
		i. Elbow fitting (10)	Position	
		j. Nut (9)	Install	Secure elbow fitting (10)
		k. Hose assembly (8)	Position	
		l. Hose fittings (7 and 6)	Connect and tighten	Completes installation of hose assembly (8)
		m. Hose assembly (5)	Position	
		n. Hose fitting (4)	Connect and tighten	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

f. Hoses, Lines and Fittings (cont).

(3) Mast Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
11	Mast assembly, outer mast	a. Four fittings (3B)	Install	
		b. Four nuts (3A)	Install and tighten	
		c. Four hose fittings (3)	Connect and tighten	To fittings (3B); completes installation of hose assemblies (5)
		d. Two tube assemblies (2E and 2D)	Position	On outer mast
		e. Two clamps (2C), lock washers (2B) and cap screws (2A)	Position, install, and tighten	Secures tube assemblies (2E and 2D)
		f. Four tube fittings (2)	Connect and tighten	To fittings (3B)
		g. Four tube fittings (1)	Connect and tighten	To control valve hoses as indicated by tags applied in step 1a above
12	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate control valve levers (lift, rotate, shift, and tilt control levers) several times c. Operate engine at idle speed and check for oil leaks at connections. Tighten fittings if necessary d. Turn engine off e. Check hydraulic reservoir oil level; add oil if necessary (refer to current lubrication order) f. Repeat steps a through e	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. *Hydraulic Reservoir.*

(1) Draining, Cleaning, and Refilling. This task covers servicing which consists of draining, cleaning, and refilling the hydraulic reservoir.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Container, 18 gallon capacity	

MATERIALS/PARTS
- Cleaning solvent P-D-680
- Clean cloths
- O-rings
- Replacement hydraulic oil filter
- Replacement air breather

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Right side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
DRAINING				
1	Hydraulic reservoir, bottom	a. Dipstick	Remove	
		b. 18 gallon container	Position	Under magnetic drain plug (1)
		c. Magnetic drain plug (1)	Remove and drain oil	
		d. Magnetic drain plug (1)	Clean and reinstall	
CLEANING				
2	Hydraulic reservoir, rear	a. Cap screw (2)	Loosen, then remove cover (7) and attached parts as an assembly	
		b. O-ring (3)	Remove and discard	

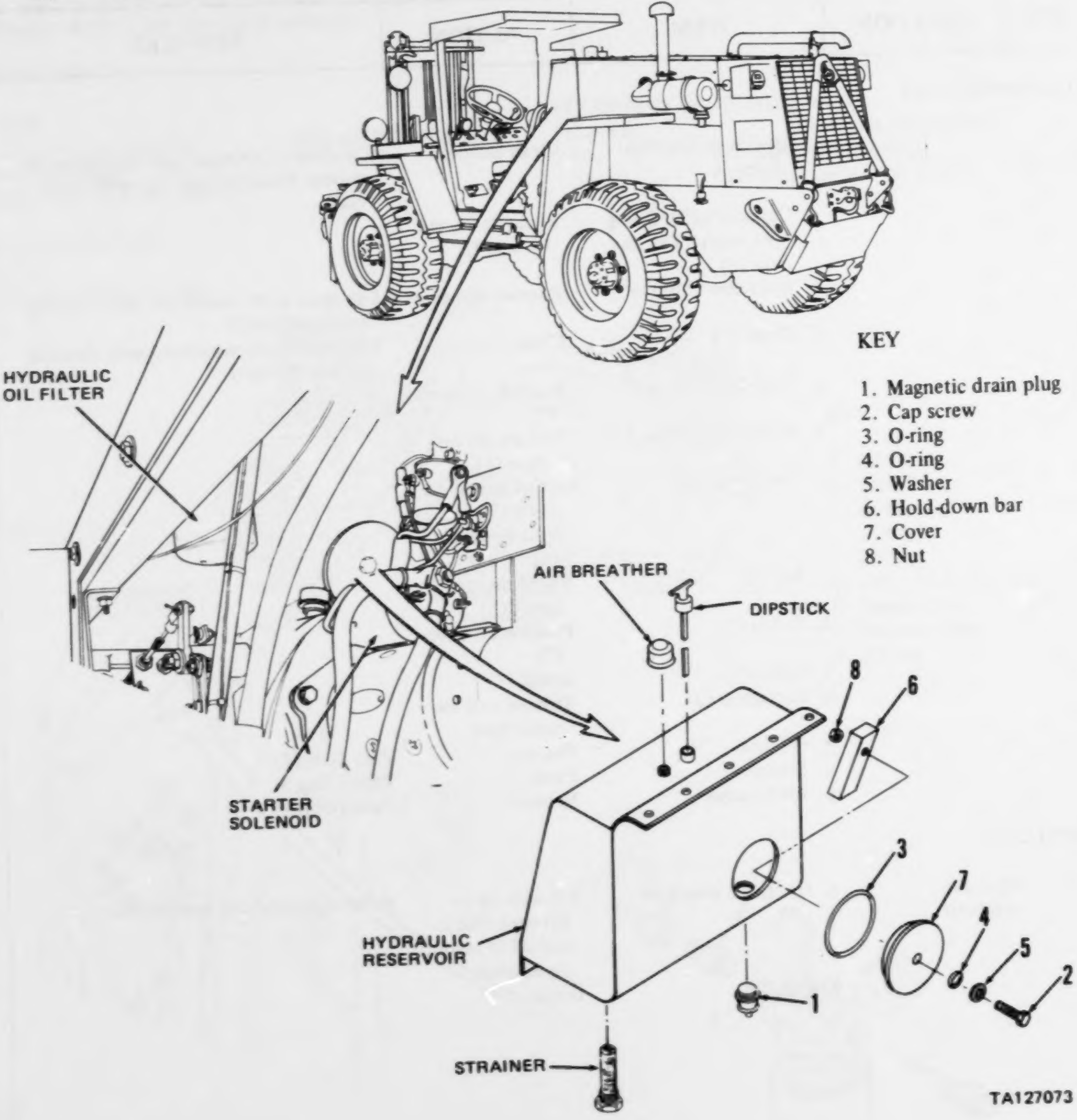
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(1) Draining, Cleaning, and Refilling (cont).


HYDRAULIC OIL FILTER
AIR BREATHER
DIPSTICK
STARTER SOLENOID
HYDRAULIC RESERVOIR
STRAINER
1
2
3
4
5
6
7
8
TA127073

KEY

1. Magnetic drain plug
2. Cap screw
3. O-ring
4. O-ring
5. Washer
6. Hold-down bar
7. Cover
8. Nut

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(1) Draining, Cleaning, and Refilling (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
2 (cont)		c. Hydraulic reservoir interior	Clean interior	Use clean cloth moistened with cleaning solvent P-D-680; wipe dry with clean cloth
		d. Cap screw (2), O-ring (4), washer (5), and nut (8)	Remove; discard O-ring (4)	
		e. Hold-down bar (6)	Remove and clean	Use clean cloth moistened with cleaning solvent P-D-680
		f. Cover (7)	Clean	Use clean cloth moistened with cleaning solvent P-D-680
		g. Hold-down bar (6)	Position on cover (7)	
		h. Washer (5), O-ring (4)	Position on cap screw (2)	
		i. Cap screw (2)	Install loosely in cover (7) and hold-down bar (6)	
		j. Nut (8)	Install on cap screw (2)	
		k. O-ring (3)	Position on cover (7)	
		l. Cover (7)	Install	
		m. Cap screw (2)	Tighten to draw cover tight	
		n. Oil filter	Replace	Para 2-56g(2)
		o. Strainer	Clean	Para 2-56g(3)
		p. Air breather	Replace	Para 2-56g(4)
REFILLING				
3	Hydraulic reservoir	a. Hydraulic reservoir fill	Fill with oil to between FULL and ADD marks on dipstick	Refer to current lubrication order
		b. Dipstick	Install	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. *Hydraulic Reservoir (cont).*

(2) Hydraulic Oil Filter Assembly. This procedure covers removal, cleaning, inspection and installation of the hydraulic oil filter, and filter head assembly.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

Clamp Type Oil Filter Wrench

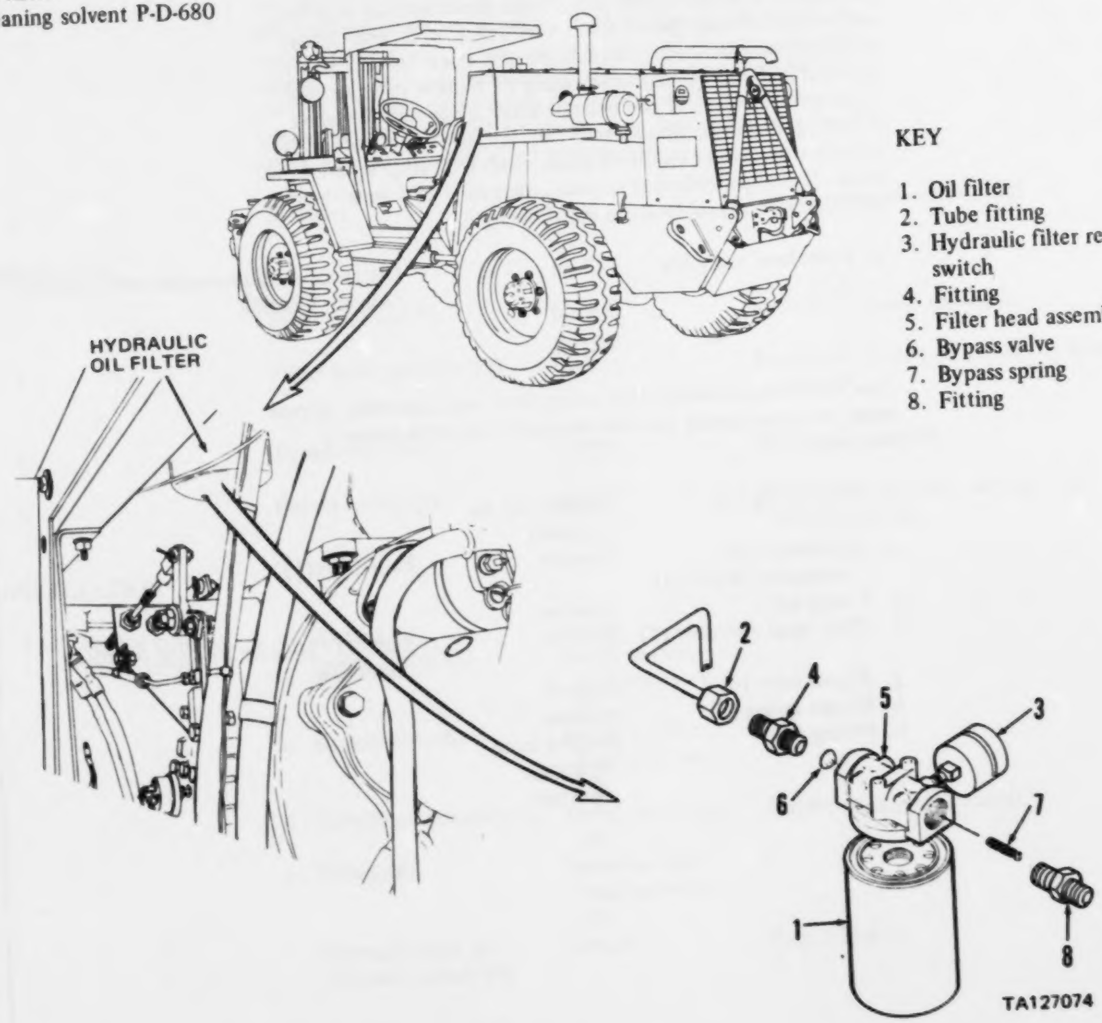
MATERIALS/PARTS

Oil filter

Cleaning solvent P-D-680

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Left side panel removed.
2-56g(1)	Hydraulic reservoir oil drained.



KEY

1. Oil filter
2. Tube fitting
3. Hydraulic filter restriction switch
4. Fitting
5. Filter head assembly
6. Bypass valve
7. Bypass spring
8. Fitting

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(2) Hydraulic Oil Filter Assembly (cont).

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">REMOVAL</td></tr>
<tr><td>1</td><td>Engine compartment, front</td><td>a. Hydraulic oil filter (1)</td><td>Remove</td><td>Use clamp type filter wrench</td></tr>
<tr><td colspan="5">WARNING
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.</td></tr>
<tr><td></td><td></td><td>b. Filter head assembly (5)</td><td>Clean</td><td>Use clean cloth moistened with cleaning solvent P-D-680</td></tr>
<tr><td colspan="5">NOTE
Don't perform following steps unless filter head assembly, bypass valve, or bypass spring has been damaged and replacement is necessary.</td></tr>
<tr><td></td><td></td><td>c. Tube fitting (2)</td><td>Loosen and disconnect</td><td></td></tr>
<tr><td></td><td></td><td>d. Hydraulic filter restriction switch (3)</td><td>Remove</td><td>Para 2-31e(1)</td></tr>
<tr><td></td><td></td><td>e. Fitting (4)</td><td>Remove</td><td></td></tr>
<tr><td></td><td></td><td>f. Filter head assembly (5)</td><td>Remove</td><td>Turn off fitting by rotating counterclockwise</td></tr>
<tr><td></td><td></td><td>g. Bypass valve (6)</td><td>Remove</td><td></td></tr>
<tr><td></td><td></td><td>h. Bypass spring (7)</td><td>Remove</td><td></td></tr>
<tr><td></td><td></td><td>i. Fitting (8)</td><td>Remove from hydraulic reservoir</td><td></td></tr>
</table>

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(2) Hydraulic Oil Filter Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680
INSPECTION				
3		Fittings (4 and 8)	Inspect	Replace if threads damaged
4		Filter head assembly (5)	Inspect	Replace if cracked, distorted, or threads damaged
5		Bypass valve (6)	Inspect	Replace if damaged
6		Bypass spring (7)	Inspect	Replace if deformed, damaged, or permanently set
INSTALLATION				
7	Engine compartment, front	a. Fitting (8)	Install	
		b. Bypass spring (7)	Install in filter head assembly (5)	
		c. Bypass valve (6)	Install in filter head assembly (5)	
		d. Filter head assembly (5)	Install on fitting (8)	Rotate clockwise to install
		e. Fitting (4)	Install in filter head assembly (5)	
		f. Hydraulic filter restriction switch (3)	Install	Para 2-31e(1)

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(2) Hydraulic Oil Filter Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
7 (cont)		g. Tube fitting (2)	Connect and tighten	
		h. Hydraulic oil filter (1)	Install until gasket contacts base. Then tighten one-half to three quarter turn	
8	Hydraulic reservoir	Hydraulic reservoir fill	Fill with oil to between FULL and ADD marks on dipstick	Refer to current lubrication order
9	Operator's compartment		a. Start engine and operate at idle speed b. Check for oil leaks at oil filter; tighten if necessary c. Turn engine off	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(3) Strainer. This procedure covers removal, cleaning, and installation of the hydraulic reservoir strainer.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

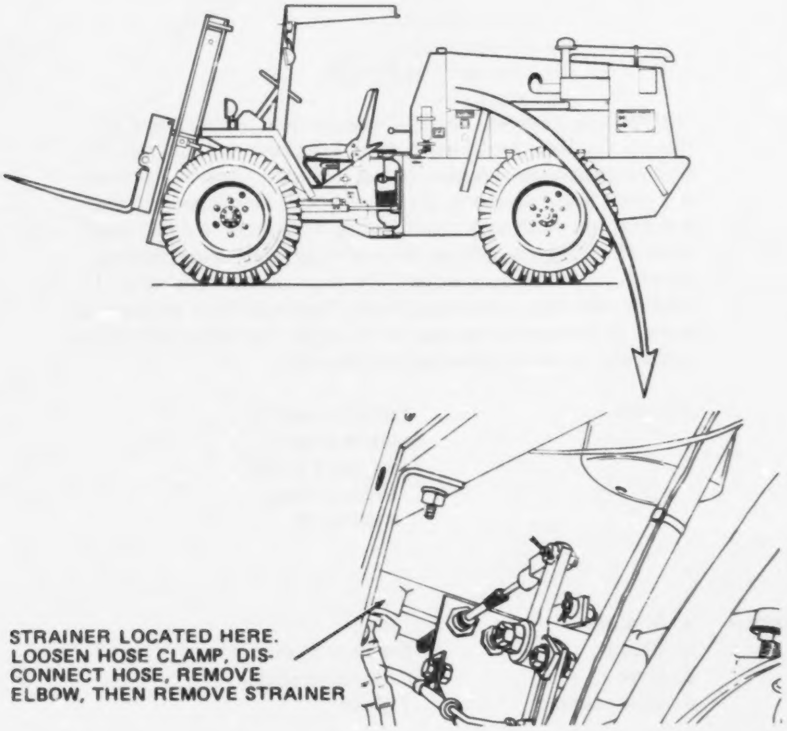
MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
2-53c	Left side panel removed.
2-56g(1)	Hydraulic reservoir oil drained.
2-53f	Front cover panel removed.


STRAINER LOCATED HERE. LOOSEN HOSE CLAMP, DISCONNECT HOSE, REMOVE ELBOW, THEN REMOVE STRAINER

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2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(3) Strainer (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, front	a. Hose clamp	Loosen	
		b. Hose	Disconnect from elbow and cap	Prevents entry of dirt
		c. Elbow	Remove from strainer	
		d. Strainer	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
		Strainer	Clean by immersing in cleaning solvent P-D-680 and dry using clean cloth	
INSTALLATION				
3	Engine compartment	a. Strainer	Install	
		b. Elbow	Install in strainer	
		c. Hose	Connect to elbow	
		d. Hose clamp	Tighten	
4	Hydraulic reservoir	Hydraulic reservoir fill	Fill with oil to between FULL and ADD marks on dipstick	Refer to current lubrication order

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(3) Strainer (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
5	Operator's compartment		a. Start engine and operate at idle speed while turning steering wheel to extreme right and left several times b. Increase engine speed and operate shift control lever to shift forks right and left several times c. Operate engine at idle speed and check for oil leaks at connections d. Turn engine off e. Check hydraulic reservoir oil level (step 4 above)	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(4) Air Breather. This task covers removal and installation of the hydraulic reservoir air breather.

INITIAL SETUP

TOOLS
None

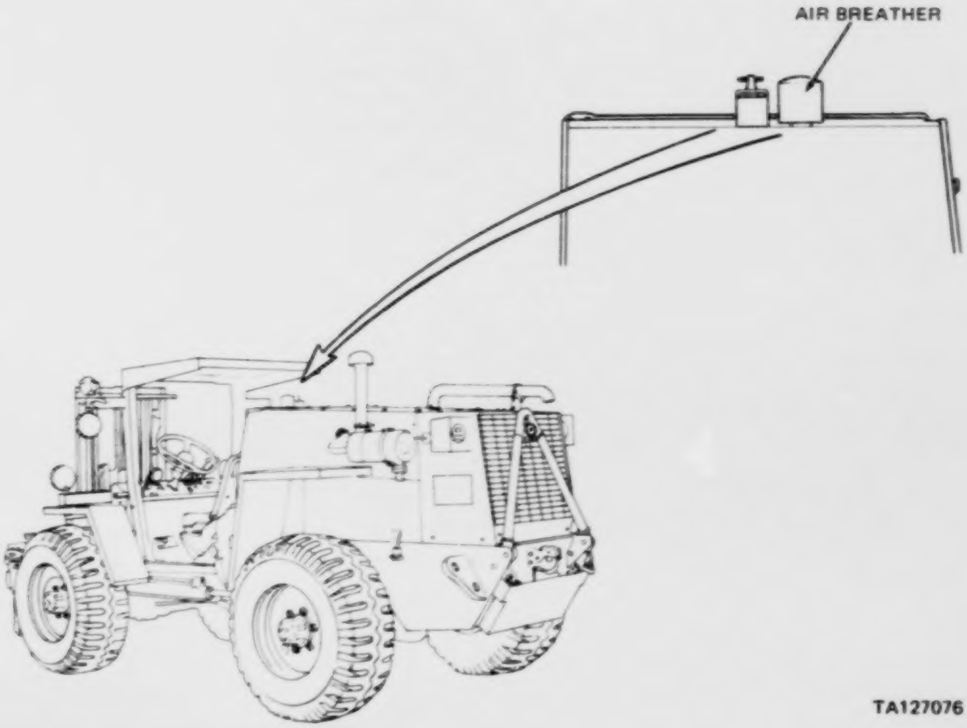
MATERIALS/PARTS
Air breather

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.

REMOVAL: Turn counterclockwise and discard

INSTALLATION: Turn clockwise



2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(5) Removal and Installation. This task covers removal, cleaning, inspection, and installation/replacement of the hydraulic reservoir.

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Chain Hoist, 1/4 ton capacity	
Shop Equipment, Welding	NSN 3740-00-357-7268
Steam Cleaning Equipment	

MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

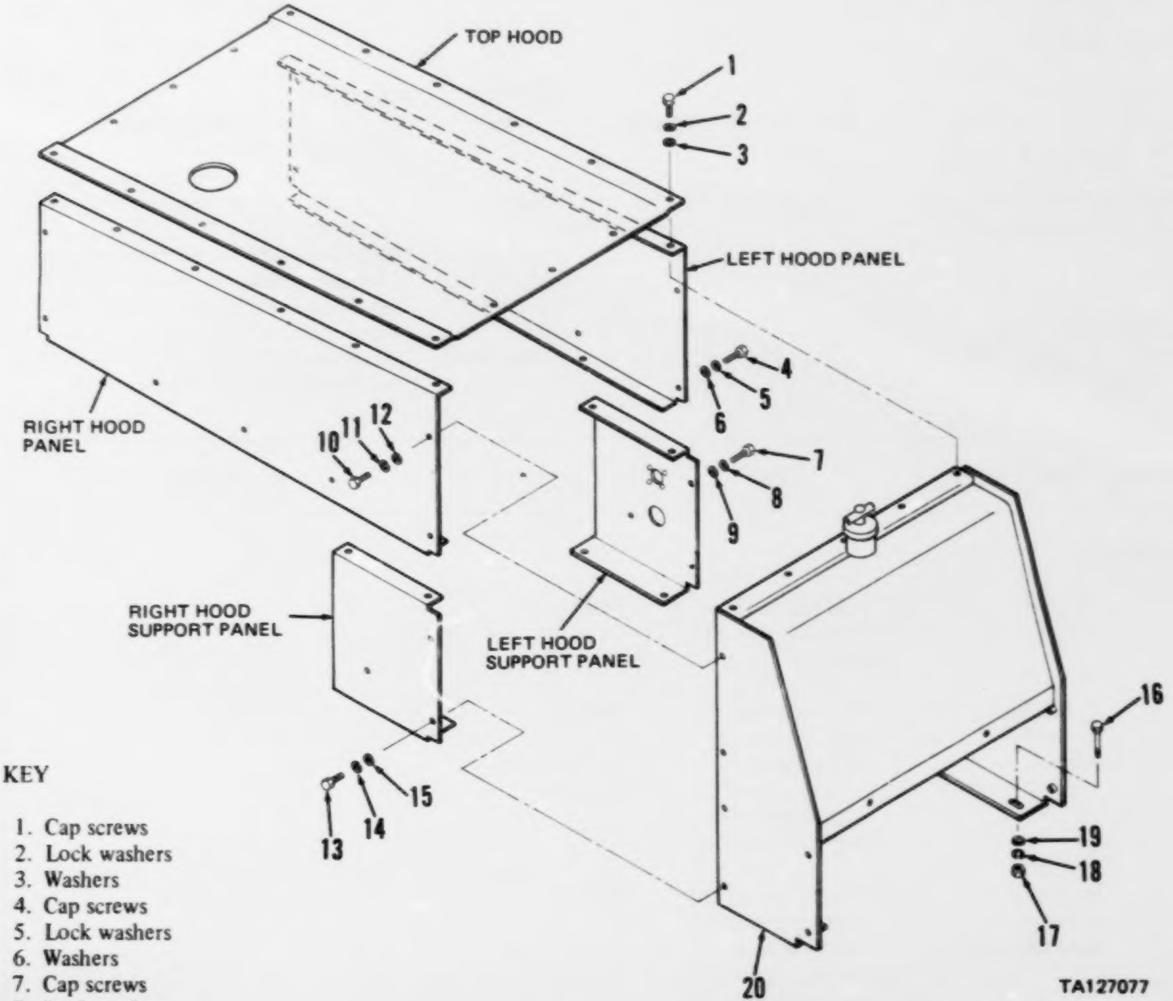
Paragraph	Condition Description
	Vehicle parked on level surface, engine off and parking brake applied.
2-56g(1)	Hydraulic reservoir drained and cover removed.
2-56g(2)	Hydraulic oil filter assembly removed.
2-56g(3)	Hydraulic reservoir strainer removed.
2-56g(4)	Air breather and dipstick removed.
2-53f	Front cover plate removed.
2-15h, step 3	Quick start kit removed.
2-15c, step 4	Air cleaner indicator removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Hydraulic reservoir, top	Five cap screws (1), lock washers (2), and washers (3)	Remove	
2	Hydraulic reservoir, left side	a. Two cap screws (4), lock washers (5), and washers (6)	Remove	
		b. Two cap screws (7), lock washers (8), and washers (9)	Remove	
3	Hydraulic reservoir, right side	a. Two cap screws (10), lock washers (11), and washers (12)	Remove	
		b. Two cap screws (13) lock washers (14), and washers (15)	Remove	
4	Hydraulic reservoir, bottom	a. Four cap screws (16), nuts (17), lock washers (18), and washers (19)	Remove	
		b. Hydraulic reservoir (20)	Remove	Pull hydraulic reservoir out just enough to attach chain hoist to it; then remove hydraulic reservoir

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. *Hydraulic Reservoir (cont).*

(5) Removal and Installation (cont).


TOP HOOD
1
2
3
LEFT HOOD PANEL
4
5
6
7
8
9
RIGHT HOOD PANEL
10
11
12
RIGHT HOOD SUPPORT PANEL
LEFT HOOD SUPPORT PANEL
16
15
14
13
19
18
17
20
TA127077

KEY

1. Cap screws
2. Lock washers
3. Washers
4. Cap screws
5. Lock washers
6. Washers
7. Cap screws
8. Lock washers
9. Washers
10. Cap screws
11. Lock washers
12. Washers
13. Cap screws
14. Lock washers
15. Washers
16. Cap screws
17. Nuts
18. Lock washers
19. Washers
20. Hydraulic reservoir

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(5) Removal and Installation (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
5		Hydraulic reservoir (20)	Clean exterior	Use cleaning solvent P-D-680
6		Hydraulic reservoir (20)	Clean interior	Use steam
INSPECTION				
7		Hydraulic reservoir (20)	Inspect	Check for cracks, breaks, dents and corrosion
8	Hydraulic reservoir	a. Dents	Hammer out	
		WARNING When welding hydraulic reservoir, partially fill it with water. Failure to do so may cause serious injury or death.		
		b. Cracks, breaks, leaks, or corrosion damage	Weld	
INSTALLATION/REPLACEMENT				
9	Rear chassis, front	Hydraulic reservoir (20)	Position, remove chain hoist. Slide into position until mounting holes are aligned	

2-56. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

g. Hydraulic Reservoir (cont).

(5) Removal and Installation (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
10	Hydraulic reservoir, bottom	Four cap screws (16), lock washers (18), washers (19), and nuts (17)	Install	Secures hydraulic reservoir
11	Hydraulic reservoir, right side	a. Two washers (15), lock washers (14), and cap screws (13)	Install	Secure right hood support panel
		b. Two washers (12), lock washers (11), and cap screws (10)	Install	Secures right hood panel
12	Hydraulic reservoir, left side	a. Two washers (9), lock washers (8), and cap screws (7)	Install	Secures left hood support plate
		b. Two washers (6), lock washers (5), and cap screws (4)	Install	Secures left hood panel
13	Hydraulic reservoir, top	Five washers (3), lock washers (2), and cap screws (1)	Install	Secures top hood

CHAPTER 3

DIRECT SUPPORT MAINTENANCE PROCEDURES

CHAPTER OVERVIEW

The purpose of this chapter is to provide you with all needed instructions and additional information to help you at the direct support level keep the equipment in good repair.

3-1. CHAPTER INDEX

Section	Title	Page
I	Engine, Fuel and Cooling Systems Maintenance	3-1
II	Electrical System Maintenance	3-88
III	Power Train Maintenance	3-123
IV	Steering System Maintenance	3-152
V	Chassis Maintenance	3-190
VI	Hydraulic Lift System Maintenance	3-194

Section I. ENGINE, FUEL AND COOLING SYSTEMS MAINTENANCE

This section contains the information you need to maintain the:

- Engine
- Fuel system
- Radiator and shroud

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of direct support maintenance.

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3-2. TROUBLESHOOTING SYMPTOM INDEX

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3-2. TROUBLESHOOTING SYMPTOM INDEX (cont)

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3-3. ENGINE TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE HARD TO START OR WILL NOT START

Step 1. Check for correct valve timing in reference to crankshaft timing marks with dial indicator (para 3-5a(1), step 2).

a. If valve timing is correct, proceed to step 2.

b. If valve timing is not correct, check for sheared key in the cam drive gear or a broken cam shaft (notify general support maintenance) (para 4-2g).

Step 2. Perform compression test of each cylinder (para 3-3, MALFUNCTION 7).

If compression test is satisfactory, check for sheared roll pin on fuel injection pump drive shaft (para 3-6c) or defective fuel injection pump (notify general support maintenance) (para 4-3b).

2. ENGINE HARD TO START OR WILL NOT START (EXHAUST SMOKE)

Step 1. Check for proper engine timing (para 3-5a).

a. If engine timing is correct, proceed to step 2.

b. If engine timing is not correct, adjust timing (para 3-5a).

Step 2. Perform compression test of each cylinder (para 3-3, MALFUNCTION 7).

If compression test is satisfactory, test fuel injector nozzles before reinstalling on engine (notify general support maintenance) (para 4-3a). If fuel injector test is satisfactory, proceed to step 3.

Step 3. Start engine and listen for excessive valve tappet noise.

If excessive valve tappet noise is heard, stop engine and check for bent push rods (para 3-5j).

3. ENGINE STARTS BUT WILL NOT RUN

Step 1. Check for proper fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing (para 3-5a(3)).

b. If fuel injection pump timing is okay, proceed to step 2.

3-3. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE STARTS BUT WILL NOT RUN (cont)

Step 2. Check for correct valve timing in reference to crankshaft timing marks with dial indicator (para 3-5a(1), step 2).

a. If correct valve timing in reference to crankshaft timing marks is not obtained, check for sheared key in cam drive gear or broken cam shaft (notify general support maintenance) (para 4-2g).

b. If correct valve timing in reference to crankshaft timing marks is obtained, proceed to step 3.

Step 3. Perform compression test of each cylinder (para 3-3, MALFUNCTION 7).

If compression test is satisfactory, test fuel injector nozzles before reinstalling on engine (notify general support maintenance) (para 4-3b). If fuel injector test is satisfactory, proceed to step 4.

Step 4. Start engine and listen for excessive valve tappet noise.

If excessive valve tappet noise is heard, stop engine and check for bent push rods (para 3-5j).

4. ENGINE MISFIRES

Step 1. Remove fuel injectors (para 3-6b) and check for damaged fuel injector nozzle seal.

a. If fuel injector nozzle seal is damaged, replace (notify general support maintenance) (para 4-3a).

b. If fuel injection seals are okay, proceed to step 2.

Step 2. Check for proper fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing (para 3-5a(3)).

b. If fuel injection pump timing is okay, proceed to step 3.

Step 3. Check for correct valve timing in reference to crankshaft timing marks with dial indicator (para 3-5a(1), step 2).

a. If correct valve timing in reference to crankshaft timing marks is not obtained, check for sheared key in cam drive gear or a broken cam shaft (notify general support maintenance) (para 4-2g).

b. If correct valve timing in reference to crankshaft timing marks is obtained, proceed to step 4.

Step 4. Perform compression test of each cylinder (para 3-3, MALFUNCTION 7).

If compression test is satisfactory, test fuel injector nozzle before reinstalling on engine (notify general support maintenance) (para 4-3a). If fuel injector test is satisfactory, proceed to step 5.

Step 5. Start engine and listen for excessive valve tappet noise.

If excessive valve tappet noise is heard, stop engine and check for bent push rods (para 3-5j).

3-3. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ENGINE STALLS FREQUENTLY OR DOES NOT DEVELOP FULL POWER

Step 1. Check for proper engine timing and valve tappet clearance adjustment (para 3-5a).

a. If engine timing and valve tappet clearance adjustment is not okay, adjust (para 3-5a).

b. If engine timing and valve tappet clearance adjustment is okay, proceed to step 2.

Step 2. Check fuel injection pump timing and speed adjustments (para 3-5a(3)).

a. If fuel injection pump timing and speed adjustments are not okay, adjust as described in paragraph 3-5a(3).

b. If fuel injection pump timing and speed adjustments are okay, proceed to step 3.

Step 3. Perform compression test of each cylinder (para 3-3 MALFUNCTION 7).

If compression test is satisfactory, test fuel injector nozzles before reinstalling on engine (notify general support maintenance) (para 4-3a). If fuel injector test is satisfactory, check for camshaft installed one tooth out of time or a defective fuel injection pump (notify general support maintenance) (para 4-2g or 4-3b).

6. ENGINE KNOCKS

Step 1. Start engine and listen for chucking or pounding sound at low speed, which disappears as engine speed is increased.

a. If chucking or pounding sound is heard at low speed and disappears as engine speed is increased, check flywheel for looseness or damage (notify general support maintenance) (para 4-2e).

b. If chucking or pounding sound is not heard, proceed to step 2.

Step 2. Start engine and listen for a sharp metallic sound which increases as engine speed increases. Crack (open) the injector line to each cylinder, one at a time, to check if the knock stops or decreases.

a. If the knock stops or decreases, check for defective rod bearing on affected cylinder (notify general support maintenance) (para 4-2f).

b. If the knock increases, check for defective piston pin (notify general support maintenance) (para 4-2f).

c. If knock is not heard, proceed to step 3.

Step 3. Start engine and listen for a thudding sound which increases as engine speed increases.

a. If thudding sound is heard which increases as engine speed increases, check main bearings for wear or damage (notify general support maintenance) (para 4-2d).

b. If thudding sound is not heard, proceed to step 4.

Step 4. Start engine and listen for one thudding sound when increasing engine speed and one thud when decreasing speed.

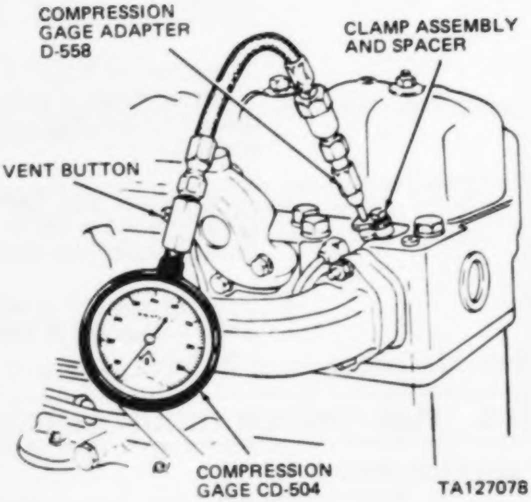
Check camshaft and crankshaft for excessive end play (notify general support maintenance) (para 4-2g and 4-2d).

3-3. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE COMPRESSION TEST

Remove fuel injectors, and clean fuel injector bores in cylinder head (para 3-6b).
Install D-558 compression gage adapter (FSCM 05083 P/N 70-314) in fuel injector bore at No. 4 cylinder, and secure with clamp assembly and spacer as shown.
Connect compression gage (FSCM 10988 P/N CD-504) to adapter, crank engine with starter, and record gage reading.
Depress vent button to relieve gage pressure and repeat test.



NOTE

Engine cranking speed must be approximately 200 RPM for reliable test results. If necessary, charge batteries to maintain proper cranking speed.

Disconnect compression gage and adapter from No. 4 cylinder and repeat above test at remaining three cylinders.
The gage reading for any one cylinder at a given altitude above sea level must not be less than the minimum listed in the chart below.
In addition, the difference between gage readings for the highest and lowest cylinders should not exceed 25 PSIG.

CYLINDER COMPRESSION TEST CHART

Minimum Compression Pressure at 200 RPM (PSIG)	Altitude Above Sea Level (Feet)
400	0
384	1,000
360	2,500
320	5,000
280	7,500
240	10,000

3-3. ENGINE TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE COMPRESSION TEST (cont)

a. If compression is high, remove cylinder head and check for carbon deposits on cylinder head and piston crown (para 3-5g). Also, check (use micrometer) if too much material was removed from resurfaced cylinder head (cylinder head minimum thickness is 3.968 inches) (notify general support maintenance) (para 4-2b).

b. If compression is low, squirt a teaspoon of engine oil into the affected cylinder and repeat compression test. If compression gage reading increases to near normal, remove cylinder head (para 3-5g) and check piston rings and sleeves (notify general support maintenance) (para 4-2f and 4-2a).

c. If compression gage reading remains low after squirting oil in cylinder, remove cylinder head (para 3-5g) and check for blown head gasket. If gasket is not damaged, check for burned or damaged valves and valve seats (notify general support maintenance) (para 4-2b).

d. If compression is low, and items in steps b and c above check satisfactorily, check for head gasket leakage due to excessive piston sleeve protrusion (notify general support maintenance) (para 4-2a).

3-4. FUEL SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. ENGINE IDLE SPEED INCORRECT

Perform fuel injection pump timing and idle speed adjustments (para 3-5a(3)).

a. If idle speed screw on injection pump does not vary engine speed, replace fuel injection pump (para 3-6c).

b. If idle speed screw on injection pump changes engine speed, but will not adjust to correct value, check accelerator linkage (para 2-15i). If accelerator linkage checks satisfactory, check fuel pressure (para 2-10) and fuel injectors (para 3-6b). If above checks are satisfactory, replace fuel injection pump (para 3-6c).

2. ENGINE NO-LOAD GOVERNED SPEED INCORRECT

Perform fuel injection pump timing and no-load governed speed adjustments (para 3-5a(3)).

a. If high speed screw on injection pump does not vary engine speed, replace fuel injection pump (para 3-6c).

b. If high speed screw on injection pump varies engine speed, but will not reduce speed to correct value (no-load speed too high), replace fuel injection pump (para 3-6c).

c. If high speed screw on injection pump varies engine speed, but will not increase speed to correct value (no-load speed too low), check accelerator linkage (para 2-15i), fuel pressure (para 2-10) and fuel injectors (para 3-6b). If above checks are satisfactory, replace fuel injection pump (para 3-6c).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE HARD TO START

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Disconnect fuel lines from fuel injection pump at fuel injectors (para 3-6a) one at a time, crank engine and check that fuel is pumped out of disconnected line.

a. If fuel is not pumped out of any one disconnected line when engine is cranked, replace associated connector screw (para 4-3b; notify general support maintenance). If fuel is not pumped out of any line when disconnected, replace/clean inlet strainer (para 4-3b; notify general support maintenance).

b. If fuel is cranked out of all lines when disconnected, proceed to step 3.

Step 3. Disassemble fuel injection pump and check transfer pump blades for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump blades are worn or damaged, replace (para 4-3b).

b. If transfer pump blades check okay, proceed to step 4.

Step 4. Disassemble fuel injection pump and check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, proceed to step 5.

Step 5. Disassemble fuel injection pump and check end plate regulating piston and sleeve and inspect for burrs, corrosion, or varnishes (para 4-3b; notify general support maintenance).

a. If regulating piston and sleeve are burred, corroded, or varnish accumulation present, replace (para 4-3b).

b. If regulating piston and sleeve check okay, proceed to step 6.

Step 6. Disassemble fuel injection pump and check governor linkage for binding, foreign matter, and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay and no foreign matter present, proceed to step 7.

Step 7. Check governor linkage for proper adjustment (para 4-3b; notify general support maintenance).

a. Adjust governor linkage (para 4-3b).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE HARD TO START (cont)

Step 7. (cont)

b. If governor linkage adjustment is okay, proceed to step 8.

Step 8. Check governor linkage hook for proper adjustment (para 4-3b; notify general support maintenance).

a. If governor hook is not properly adjusted, adjust (para 4-3b).

b. If governor hook is properly adjusted, proceed to step 9.

Step 9. Disassemble fuel injection pump and check governor parts and linkage for wear, sticking condition, or binding (para 4-3b; notify general support maintenance).

a. If governor parts and linkage are worn, sticking, or binding replace (para 4-3b).

b. If governor parts and linkage are okay, proceed to step 10.

Step 10. Check fuel injection pump maximum fuel setting on test set-up (para 4-3b; notify general support maintenance).

a. If fuel injection pump maximum fuel setting is not correct, adjust (para 4-3b).

b. If fuel injection pump maximum fuel setting is okay, proceed to step 11.

Step 11. Remove delivery valve and inspect for dirt or improper installation (para 4-3b; notify general support maintenance).

a. If delivery valve is dirty, clean or replace it; if improperly installed, install correctly (para 4-3b).

b. If delivery valve is clean and properly installed, proceed to step 12.

Step 12. Remove cam, shoes, and rollers and inspect for wear (para 4-3b; notify general support maintenance).

a. If cam, shoes, or rollers are worn, replace (para 4-3b).

b. If cam, shoes, and rollers are okay, proceed to step 13.

Step 13. Remove plungers and inspect for burrs, corrosion or varnishes (para 4-3b; notify general support maintenance).

a. If plungers are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If plungers are okay, proceed to step 14.

Step 14. Check rotor and hydraulic head assembly (in plunger area) for wear (para 4-3b; notify general support maintenance).

a. If rotor and hydraulic head are worn in plunger area, replace (para 4-3b).

b. If rotor and hydraulic head are okay, proceed to step 15.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. ENGINE HARD TO START (cont)

Step 15. Check adjustment of torque screw (para 4-3b; notify general support maintenance).

a. If torque screw out of adjustment, adjust (para 4-3b).

b. If torque screw adjustment is okay, proceed to step 16.

Step 16. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 17.

Step 17. Check delivery valve screw for tightness (para 4-3b; notify general support maintenance).

a. If delivery valve screw is loose, tighten (para 4-3b).

b. If delivery valve screw is tight, remove it. Then, remove delivery valve and inspect seat for erosion (para 4-3b).

1) If seat is eroded, replace delivery valve (para 4-3b).

2) If seat is okay, reinstall, tighten delivery valve screw (para 4-3b) and proceed to step 18.

Step 18. Check rotor for scores (para 4-3b; notify general support maintenance).

Replace rotor (para 4-3b).

4. ENGINE STARTS AND STOPS

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Disconnect fuel lines from fuel injection pump at fuel injectors (para 3-6a) one at a time, crank engine and check that fuel is pumped out of disconnected line.

a. If fuel is not pumped out of any one disconnected fuel line when engine is cranked, replace associated connector screw (para 4-3b; notify general support maintenance). If fuel is not pumped out of any and all lines when disconnected, replace/clean inlet strainer (para 4-3b; notify general support maintenance).

b. If fuel is cranked out of all lines when disconnected, proceed to step 3.

Step 3. Remove governor control cover (para 4-3b; notify general support maintenance) and check solenoid frame and arm assembly for cracks and swelling in encapsulated material and looseness of screw terminals. Check continuity using an ohmmeter (para 4-3b; notify general support maintenance).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. ENGINE STARTS AND STOPS (cont)

Step 3. (cont)

a. If cracks, swelling or loose screw terminals are observed, replace solenoid frame and arm assembly (para 4-3b); if continuity not obtained, replace solenoid frame and arm assembly (para 4-3b).

b. If solenoid frame and arm assembly checks okay, proceed to step 4.

Step 4. Disassemble fuel injection pump and check governor linkage for binding, foreign matter, and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay and no foreign matter present, proceed to step 5.

Step 5. Disassemble fuel injection pump and check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, proceed to step 6.

Step 6. Disassemble fuel injection pump and check cam roller shoes for burrs; also check for freedom of rotation, chipping, and abrasive wear patterns (para 4-3b; notify general support maintenance).

a. Replace cam roller shoes if burred, sticking, chipped, or abrasive wear pattern observed (para 4-3b).

b. If cam roller shoes check okay, proceed to step 7.

Step 7. Remove plungers and inspect for burrs, corrosion, or varnishes (para 4-3b; notify general support maintenance).

If plungers are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

5. ERRATIC ENGINE OPERATION (SURGE, MISFIRING, POOR GOVERNOR REGULATION)

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in para 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Remove inlet strainer and check for clogged condition (para 4-3b; notify general support maintenance).

a. If inlet strainer is clogged, either clean or replace strainer (para 4-3b).

b. If inlet strainer is not clogged, proceed to step 3.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ERRATIC ENGINE OPERATION (SURGE, MISFIRING, POOR GOVERNOR REGULATION) (cont)

Step 3. Disconnect and remove fuel injector return lines (para 3-6a). Check return lines for clogged condition.

a. If fuel injector return lines are clogged, clean as described in paragraph 3-6a. After cleaning return lines, recheck to ensure that all foreign matter has been removed, then reinstall (para 3-6a).

b. If fuel injector return lines are not clogged, proceed to step 4.

Step 4. Disassemble fuel injection pump and check automatic advance components (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 5.

Step 5. Disassemble fuel injection pump and check governor linkage for binding, foreign matter, and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay and no foreign matter present, proceed to step 6.

Step 6. Check that metering valve spring shim is installed (para 4-3b; notify general support maintenance).

a. If metering valve spring shim is not installed, install (para 4-3b).

b. If metering valve spring shim is installed, proceed to step 7.

Step 7. Disassemble fuel injection pump and check governor parts and linkage for wear, sticking condition, or binding (para 4-3b; notify general support maintenance).

a. If governor parts and linkage are worn, sticking, or binding replace (para 4-3b).

b. If governor parts and linkage are okay, proceed to step 8.

Step 8. Remove governor spring and inspect (para 4-3b; notify general support maintenance).

a. If governor spring is broken or permanently set, replace (para 4-3b).

b. If governor spring checks okay, proceed to step 9.

Step 9. Check governor linkage hook for correct adjustment (para 4-3b; notify general support maintenance).

a. If governor linkage hook is not adjusted properly, adjust as described in para 4-3b.

b. If governor linkage hook is adjusted properly, proceed to step 10.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ERRATIC ENGINE OPERATION (SURGE, MISFIRING, POOR GOVERNOR REGULATION) (cont)

Step 10. Remove and inspect idle spring (para 4-3b; notify general maintenance).

a. If idle spring is broken or permanently set, replace (para 4-3b).

b. If idle spring is okay, proceed to step 11.

Step 11. Remove governor thrust sleeve and check for burrs and dirt (para 4-3b; notify general support maintenance).

a. Remove burrs using crocus cloth; clean governor thrust sleeve as described in paragraph 4-3b.

b. If governor thrust sleeve checks okay, proceed to step 12.

Step 12. Check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, proceed to step 13.

Step 13. Remove fuel injection pump regulating piston and sleeve and inspect for burrs, corrosion, and varnish accumulation (para 4-3b; notify general support maintenance).

a. If piston and sleeve are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If piston and sleeve check okay, proceed to step 14.

Step 14. Check delivery valve screw for tightness (para 4-3b; notify general support maintenance).

a. If delivery valve screw is loose, tighten (para 4-3b).

b. If delivery valve screw is tight, remove it. Then, remove delivery valve and inspect seat for erosion (para 4-3b).

1) If seat is eroded, replace delivery valve (para 4-3b).

2) If seat is okay, reinstall and tighten delivery valve screw (para 4-3b) and proceed to step 15.

Step 15. Check delivery valve for cleanliness or improper installation (para 4-3b; notify general support maintenance).

a. If delivery valve is dirty, clean or replace it (para 4-3b); if improperly installed, install correctly (para 4-3b).

b. If delivery valve is clean and properly installed, proceed to step 16.

Step 16. Disassemble fuel injection pump and check cam roller shoes for burrs; also check for freedom of rotation, chipping, and abrasive wear patterns (para 4-3b; notify general support maintenance).

a. Replace cam roller shoes if burred, sticking, chipped or abrasive wear pattern observed (para 4-3b).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. ERRATIC ENGINE OPERATION (SURGE, MISFIRING, POOR GOVERNOR REGULATION) (cont)

Step 16. (cont)

b. If cam roller shoes check okay, proceed to step 17.

Step 17. Check that hydraulic head screws are tight or are not missing (para 4-3b; notify general support maintenance).

a. If hydraulic head screws are not tight or are missing, tighten and/or install (para 4-3b).

b. If hydraulic head screws are tight and not missing, proceed to step 18.

Step 18. Remove plungers and inspect for burrs, corrosion or varnishes (para 4-3b; notify general support maintenance).

a. If plungers are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If plungers are okay, proceed to step 19.

Step 19. Check drive shaft tang dimension (should be not less than 0.305 inch) (para 4-3b; notify general support maintenance).

a. If drive shaft tang measures less than 0.305 inch, replace drive shaft (para 4-3b).

b. If drive shaft tang measures more than 0.305 inch, replace head and rotor assembly (para 4-3b).

6. ENGINE IDLES IMPERFECTLY

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Disassemble fuel injection pump and check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, proceed to step 3.

Step 3. Disassemble fuel injection pump and check governor parts and linkage for wear, sticking condition, or binding (para 4-3b; notify general support maintenance).

a. If governor parts and linkage are worn, sticking, or binding, replace (para 4-3b).

b. If governor parts and linkage are okay, proceed to step 4.

Step 4. Disassemble fuel injection pump and check governor linkage and metering valve for binding, foreign matter and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. ENGINE IDLES IMPERFECTLY (cont)

Step 4. (cont)

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay, proceed to step 5.

Step 5. Check that metering valve spring shim is installed (para 4-3b; notify general support maintenance).

a. If metering valve spring shim is not installed, install (para 4-3b).

b. If metering valve spring shim is installed, proceed to step 6.

Step 6. Remove and inspect idle spring (para 4-3b; notify general support maintenance).

a. If idle spring is broken or permanently set, replace (para 4-3b).

b. If idle spring is okay, proceed to step 7.

Step 7. Check governor linkage hook for proper adjustment (para 4-3b; notify general support maintenance).

a. If governor hook is not properly adjusted, adjust (para 4-3b).

b. If governor hook is properly adjusted, proceed to step 8.

Step 8. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 9.

Step 9. Remove fuel injection pump regulating piston and sleeve and inspect for burrs, corrosion, and varnish accumulation (para 4-3b; notify general support maintenance).

a. If piston and sleeve are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If piston and sleeve check okay, proceed to step 10.

Step 10. Remove governor spring and inspect (para 4-3b; notify general support maintenance).

a. If governor spring is broken or permanently set, replace (para 4-3b).

b. If governor spring checks okay, proceed to step 11.

Step 11. Inspect governor linkage for breaks or cracks (para 4-3b; notify general support maintenance).

a. If governor linkage is broken or cracked, replace and adjust (para 4-3b).

b. If governor linkage checks okay, proceed to step 12.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. ENGINE IDLES IMPERFECTLY (cont)

Step 12. Check that hydraulic head screws are tight or are not missing (para 4-3b; notify general support maintenance).

a. If hydraulic head screws are not tight or are missing, tighten and/or install (para 4-3b).

b. If hydraulic head screws are tight and not missing, proceed to step 13.

Step 13. Check rotor and hydraulic head assembly (in plunger area) for wear (para 4-3b; notify general support maintenance).

a. If rotor and hydraulic head are worn in plunger area, replace (para 4-3b).

b. If rotor and head are okay, proceed to step 14.

Step 14. Remove delivery valve and inspect for dirt or improper installation (para 4-3b; notify general support maintenance).

a. If delivery valve is dirty, clean or replace it; if improperly installed, install correctly (para 4-3b).

b. If delivery valve is clean and properly installed, proceed to step 15.

Step 15. Remove plungers and inspect for burrs, corrosion or varnish accumulation (para 4-3b; notify general support maintenance).

Replace plungers if burred, corroded, or varnish accumulation is present (para 4-3b).

7. ENGINE DOES NOT DEVELOP FULL POWER OR SPEED

Step 1. Check throttle arm installation and adjustment (para 2-15i).

a. If throttle arm installation is not correct or if adjustment is not correct, correct installation and adjust as described in paragraph 2-15i.

b. If throttle arm installation is correct and if adjustment is correct, proceed to step 2.

Step 2. Check governor linkage for proper adjustment (para 4-3b; notify general support maintenance).

a. Adjust governor linkage (para 4-3b).

b. If governor linkage adjustment is okay, proceed to step 3.

Step 3. Check governor no-load governed speed for proper adjustment (para 3-5a).

a. If governor no-load governed speed is not adjusted properly, adjust as described in paragraph 3-5a.

b. If governor no-load governed speed is adjusted properly, proceed to step 4.

Step 4. Remove inlet strainer and check for clogged condition (para 4-3b; notify general support maintenance).

a. If inlet strainer is clogged, either clean or replace strainer (para 4-3b).

b. If inlet strainer is not clogged, proceed to step 5.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE DOES NOT DEVELOP FULL POWER OR SPEED (cont)

Step 5. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 6.

Step 6. Disconnect and remove fuel injector return lines (para 3-6a).
Check return lines for clogged condition.

a. If fuel injector return lines are clogged, clean as described in paragraph 3-6a. After cleaning return lines, recheck to ensure that all foreign matter has been removed, then reinstall (para 3-6a).

b. If fuel injector return lines are not clogged, proceed to step 7.

Step 7. Disconnect fuel lines from fuel injection pump at fuel injectors (para 3-6a) one at a time, crank engine and check that fuel is pumped out of disconnected fuel line.

a. If fuel is not pumped out of disconnected fuel line when engine is cranked, replace associated connector screw (para 4-3b; notify general support maintenance).

b. If fuel is pumped out of disconnected fuel line, proceed to step 8.

Step 8. Disassemble fuel injection pump and check governor parts and linkage for wear, sticking condition, or binding (para 4-3b; notify general support maintenance).

a. If governor parts and linkage are worn, sticking, or binding replace (para 4-3b).

b. If governor parts and linkage are okay, proceed to step 9.

Step 9. Disassemble fuel injection pump and check governor linkage and metering valve for binding, foreign matter and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay, proceed to step 10.

Step 10. Check governor linkage hook for proper adjustment (para 4-3b; notify general support maintenance).

a. If governor hook is not properly adjusted, adjust (para 4-3b).

b. If governor hook is properly adjusted, proceed to step 11.

Step 11. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 12.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE DOES NOT DEVELOP FULL POWER OR SPEED (cont)

Step 12. Disassemble fuel injection pump and check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, proceed to step 13.

Step 13. Check fuel injection pump maximum fuel setting on test set-up (para 4-3b; notify general support maintenance).

a. If fuel injection pump maximum fuel setting is not correct, adjust (para 4-3b).

b. If fuel injection pump maximum fuel setting is okay, proceed to step 14.

Step 14. Remove delivery valve and inspect for dirt or improper installation (para 4-3b; notify general support maintenance).

a. If delivery valve is dirty, clean or replace it; if improperly installed, install correctly (para 4-3b).

b. If delivery valve is clean and properly installed, proceed to step 15.

Step 15. Remove cam, shoes, and rollers and inspect for wear (para 4-3b; notify general support maintenance).

a. If cam, shoes, or rollers are worn, replace (para 4-3b).

b. If cam, shoes, and rollers are okay, proceed to step 16.

Step 16. Remove plungers and inspect for burrs, corrosion or varnishes (para 4-3b; notify general support maintenance).

a. If plungers are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If plungers are okay, proceed to step 17.

Step 17. Check rotor and hydraulic head assembly (in plunger area) for wear (para 4-3b; notify general support maintenance).

a. If rotor and hydraulic head are worn in plunger area, replace (para 4-3b).

b. If rotor and hydraulic head are okay, proceed to step 18.

Step 18. Check drive shaft tang dimension (should be not less than 0.305 inch) (para 4-3b; notify general support maintenance).

a. If drive shaft tang measures less than 0.305 inch, replace drive shaft (para 4-3b).

b. If drive shaft tang measures more than 0.305 inch, proceed to step 19.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. ENGINE DOES NOT DEVELOP FULL POWER OR SPEED (cont)

Step 19. Check that hydraulic head screws are tight or are not missing (para 4-3b; notify general support maintenance).

a. If hydraulic head screws are not tight or are missing, tighten and/or install (para 4-3b).

b. If hydraulic head screws are tight and not missing, proceed to step 20.

Step 20. Check rotor for scores (para 4-3b; notify general support maintenance).

a. If rotor is scored, replace it (para 4-3b).

b. If rotor is okay, proceed to step 21.

Step 21. Check delivery valve screw for tightness (para 4-3b; notify general support maintenance).

a. If delivery valve screw is loose, tighten (para 4-3b).

b. If delivery valve screw is tight, remove it. Then, remove delivery valve and inspect seat for erosion (para 4-3b).

1) If seat is eroded, replace delivery valve (para 4-3b).

2) If seat is okay, reinstall, tighten delivery valve screw (para 4-3b) and proceed to step 22.

Step 22. Check adjustment of torque screw (para 4-3b; notify general support maintenance).

a. If torque screw out of adjustment, adjust (para 4-3b).

b. If torque screw adjustment is okay, proceed to step 23.

Step 23. Check if hydraulic vent head wires are missing (para 4-3b; notify general support maintenance).

Install vent head wires (para 4-3b).

8. ENGINE SMOKES BLACK

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 3.

Step 3. Remove cam, shoes, and rollers and inspect for wear (para 4-3b; notify general support maintenance).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
  TEST OR INSPECTION
    CORRECTIVE ACTION

8. ENGINE SMOKES BLACK (cont)

Step 3. (cont)

a. If cam, shoes, or rollers are worn, replace (para 4-3b).

b. If cam, shoes, and rollers are okay, adjust torque screw (para 4-3b).

9. ENGINE SMOKES BLUE OR WHITE

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 3.

Step 3. Check rotor for scores (para 4-3b; notify general support maintenance).

Replace rotor (para 4-3b).

10. FUEL NOT REACHING FUEL INJECTION PUMP

Step 1. Disassemble fuel injection pump and check for cause of seizure of rotor assembly (para 4-3b; notify general support maintenance).

a. Replace hydraulic head and rotor assembly (para 4-3b).

a. If hydraulic head and rotor assembly are okay, proceed to step 2.

Step 2. Remove inlet strainer and check for clogged condition (para 4-3b; notify general support maintenance).

a. If inlet strainer is clogged, either clean or replace strainer (para 4-3b).

b. If strainer is not clogged, proceed to step 3.

Step 3. Disassemble transfer pump and check that transfer pump liner locating pin is in correct hole (para 4-3b; notify general support maintenance).

a. If locating pin is in wrong hole, remove and install in correct hole (para 4-3b).

b. If locating pin is in correct hole, proceed to step 4.

Step 4. Disassemble fuel injection pump and check transfer pump parts for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump parts are worn or damaged, replace (para 4-3b).

b. If transfer pump parts check okay, replace end plate regulating piston and sleeve (para 4-3b).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. FUEL DELIVERED FROM TRANSFER PUMP BUT NOT TO FUEL INJECTORS

Step 1. Remove governor control cover (para 4-3b; notify general support maintenance) and check solenoid frame and arm assembly for cracks and swelling in encapsulated material and looseness of screw terminals. Check continuity using an ohmmeter (para 4-3b; notify general support maintenance).

a. If cracks, swelling or loose screw terminals are observed, replace solenoid frame and arm assembly (para 4-3b); if continuity not obtained, replace solenoid frame and arm assembly (para 4-3b).

b. If solenoid frame and arm assembly checks okay, proceed to step 2.

Step 2. Disconnect fuel lines from fuel injection pump at fuel injectors (para 3-6a) one at a time, crank engine and check that fuel is pumped out of disconnected fuel line.

a. If fuel is not pumped out of disconnected fuel line when engine is cranked, replace associated connector screw (para 4-3b; notify general support maintenance).

b. If fuel is pumped out of disconnected fuel line, proceed to step 3.

Step 3. Disassemble fuel injection pump and check governor linkage for binding, foreign matter, and burrs; check metering valve for sticking condition (para 4-3b; notify general support maintenance).

a. If linkage is binding or burred, replace (para 4-3b); if foreign matter is present, remove; if metering valve is sticking, replace (para 4-3b).

b. If linkage and metering valve check okay and no foreign matter present, proceed to step 4.

Step 4. Remove plungers and inspect for burrs, corrosion or varnishes (para 4-3b; notify general support maintenance).

a. If plungers are burred, corroded, or varnish accumulation is present, replace (para 4-3b).

b. If plungers are okay, proceed to step 5.

Step 5. Inspect governor linkage for breaks or cracks (para 4-3b; notify general support maintenance).

a. If governor linkage is broken or cracked, replace and adjust (para 4-3b).

b. If governor linkage checks okay, proceed to step 6.

Step 6. Disassemble fuel injection pump and check governor parts and linkage for wear, sticking condition, or binding (para 4-3b; notify general support maintenance).

a. If governor parts and linkage are worn, sticking, or binding replace (para 4-3b).

b. If governor parts and linkage are okay, proceed to step 7.

Step 7. Check adjustment of torque screw (para 4-3b; notify general support maintenance).

a. If torque screw out of adjustment, adjust (para 4-3b).

b. If torque screw adjustment is okay, proceed to step 8.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. FUEL DELIVERED FROM TRANSFER PUMP BUT NOT TO FUEL INJECTORS (cont)

Step 8. Disassemble fuel injection pump and check that metering valve is assembled correctly to metering valve arm (para 4-3b; notify general support maintenance).

a. If metering valve is incorrectly assembled to metering valve arm, remove and install correctly (para 4-3b).

b. If metering valve is correctly assembled to metering valve arm, proceed to step 9.

Step 9. Disassemble fuel injection pump and check that cam is not installed backwards (para 4-3b; notify general support maintenance).

a. If cam is installed backwards, remove and install properly (para 4-3b).

b. If cam is installed correctly, proceed to step 10.

Step 10. Disassemble fuel injection pump and check cam roller shoes for burrs; also check for freedom of rotation, chipping, and abrasive wear patterns (para 4-3b; notify general support maintenance).

a. Replace cam roller shoes if burred, sticking, chipped, or abrasive wear pattern observed (para 4-3b).

b. If cam roller shoes check okay, proceed to step 11.

Step 11. Check that thrust plunger is installed (para 4-3b; notify general support maintenance).

a. If thrust plunger is missing, install (para 4-3b).

b. If thrust plunger is installed, proceed to step 12.

Step 12. Disassemble fuel injection pump and check transfer pump blades for wear or damage (para 4-3b; notify general support maintenance).

a. If transfer pump blades are worn or damaged, replace (para 4-3b).

b. If transfer pump blades check okay, proceed to step 13.

Step 13. Disassemble fuel injection pump and check for foreign matter in passage from transfer pump to metering valve (para 4-3b; notify general support maintenance).

a. Remove foreign matter (para 4-3b).

b. If no foreign matter is present, proceed to step 14.

Step 14. Check rotor for scores (para 4-3b; notify general support maintenance).

a. If rotor is scored, replace it (para 4-3b).

b. If rotor is not scored, proceed to step 15.

Step 15. Check that hydraulic head screws are tight or are not missing (para 4-3b; notify general support maintenance).

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

11. FUEL DELIVERED FROM TRANSFER PUMP BUT NOT TO FUEL INJECTORS (cont)

Step 15. (cont)

a. If hydraulic head screws are not tight or are missing, tighten and/or install (para 4-3b).

b. If hydraulic head screws are tight and not missing, proceed to step 16.

Step 16. Check if hydraulic head vent wires are missing (para 4-3b; notify general support maintenance).

a. If vent wires are missing, install (para 4-3b).

b. If vent wires are installed, check and replace metering valve spring shim (para 4-3b).

12. FUEL REACHING FUEL INJECTORS BUT ENGINE WILL NOT START

Step 1. Check fuel injection pump timing (para 3-5a(3)).

a. If fuel injection pump timing is not correct, adjust timing as described in paragraph 3-5a(3).

b. If fuel injection pump timing is okay, proceed to step 2.

Step 2. Check throttle arm installation and adjustment (para 2-15i).

a. If throttle arm installation is not correct or if adjustment is not correct, correct installation and adjust as described in paragraph 2-15i.

b. If throttle arm installation is correct and if adjustment is correct, proceed to step 3.

Step 3. Check governor linkage for proper adjustment (para 4-3b; notify general support maintenance).

a. Adjust governor linkage (para 4-3b).

b. If governor linkage adjustment is okay, proceed to step 4.

Step 4. Check adjustment of torque screw (para 4-3b; notify general support maintenance).

a. If torque screw out of adjustment, adjust (para 4-3b).

b. If torque screw adjustment is okay, proceed to step 5.

Step 5. Disassemble automatic advance components and inspect (para 4-3b; notify general support maintenance).

a. If automatic advance components are worn or damaged, replace and adjust (para 4-3b).

b. If automatic advance components are okay, proceed to step 6.

Step 6. Check fuel injection pump maximum fuel setting on test set-up (para 4-3b; notify general support maintenance).

a. If fuel injection pump maximum fuel setting is not correct, adjust (para 4-3b).

b. If fuel injection pump maximum fuel setting is okay, proceed to step 7.

3-4. FUEL SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

12. FUEL REACHING FUEL INJECTORS BUT ENGINE WILL NOT START (cont)

Step 7. Remove cam, shoes, and rollers and inspect for wear (para 4-3b; notify general support maintenance).

a. If cam, shoes, or rollers are worn, replace (para 4-3b).

b. If cam, shoes, and rollers are okay, proceed to step 8.

Step 8. Check rotor and hydraulic head assembly (in plunger area) for wear (para 4-3b; notify general support maintenance).

a. If rotor and hydraulic head are worn in plunger area, replace (para 4-3b).

b. If rotor and hydraulic head are okay, proceed to step 9.

Step 9. Check that hydraulic head screws are tight or are not missing (para 4-3b; notify general support maintenance).

a. If hydraulic head screws are not tight or are missing, tighten and/or install (para 4-3b).

b. If hydraulic head screws are tight and not missing, proceed to step 10.

Step 10. Check rotor for scores (para 4-3b; notify general support maintenance).

Replace rotor (para 4-3b).

3-5. ENGINE MAINTENANCE

a. Engine Tune-up.

(1) Locating Top Dead Center.

This task covers locating top dead center position for No. 1 cylinder.

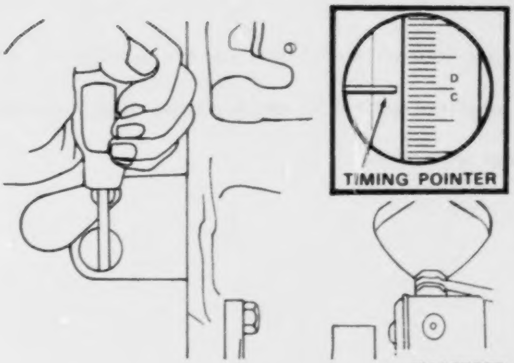
INITIAL SETUP

TOOLS
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
None

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Left side panel removed.
3-5h	Flywheel housing timing hole cover open.
3-5i	Rocker arm cover removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Flywheel housing, left side engine compartment	a. Engine flywheel	Rotate clockwise	Engage flywheel ring gear teeth with blade of screwdriver as shown. Rotate engine until pointer in timing hole is in line with TDC mark on flywheel
		 TA127227		
		b. Push rods for No. 1 cylinder	Check for looseness	If push rods are loose, engine is at TDC position for No. 1 cylinder. If push rods are not loose, rotate engine one complete revolution from position in step a above, and recheck push rods of No. 1 cylinder for looseness
2	Cylinder head, engine compartment top			

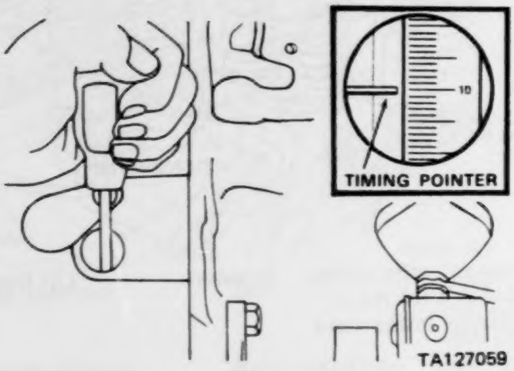
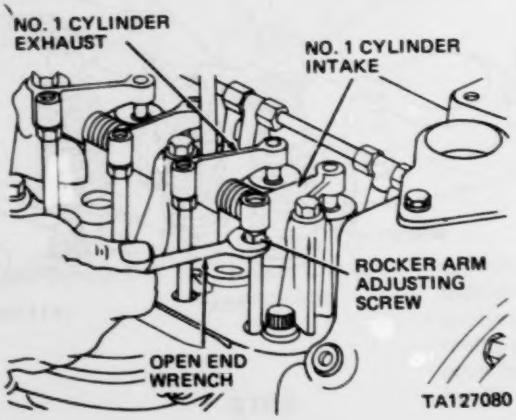
NOTE

Perform the following steps only if accuracy of flywheel timing pointer is in doubt.

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

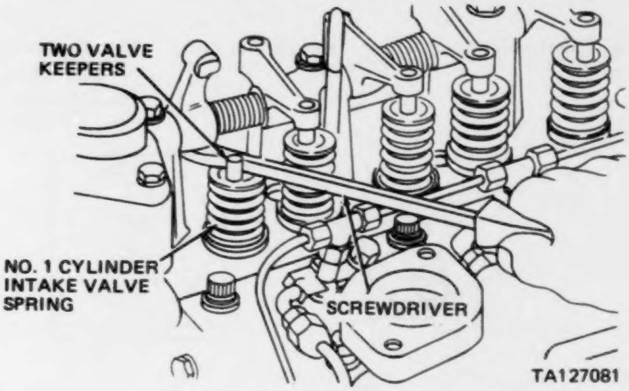
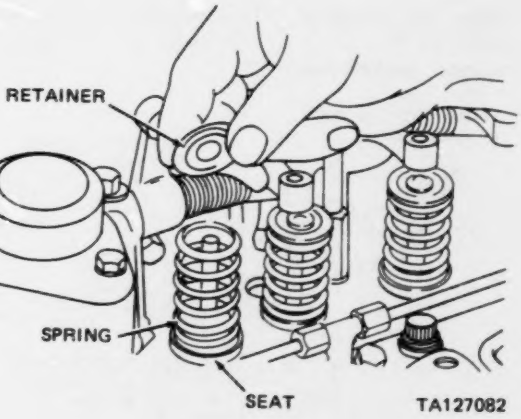
(1) Locating Top Dead Center (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
2 (cont)		a. Engine flywheel	Rotate clockwise	Engage flywheel ring gear teeth with blade of screwdriver as shown. Rotate engine until pointer in timing hole is in line with the 10° BTDC mark on flywheel  10 TIMING POINTER TA127059
		b. Rocker arm adjusting screw for No. 1 cylinder intake valve	Turn counter-clockwise	Use wrench to rotate adjusting screw inwards to take pressure off push rod  NO. 1 CYLINDER EXHAUST NO. 1 CYLINDER INTAKE ROCKER ARM ADJUSTING SCREW OPEN END WRENCH TA127080
		c. Rocker arm for No. 1 cylinder intake valve	Reposition	Push rocker arm down against valve spring and push rearwards off valve and push rod
		d. Push rod for No. 1 cylinder intake valve	Remove	Lift from cylinder head
		e. Two keepers for No. 1 cylinder intake valve	Remove	Compress valve spring using screwdriver as shown, remove valve keepers, and slowly release screwdriver

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

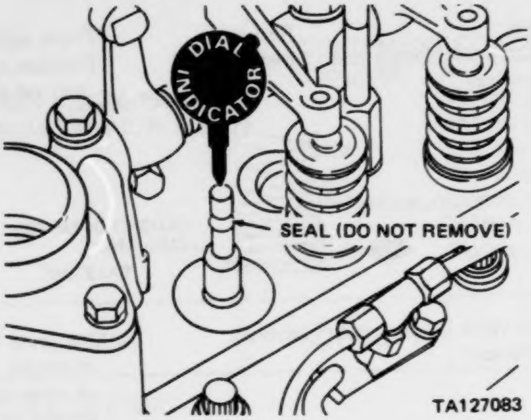
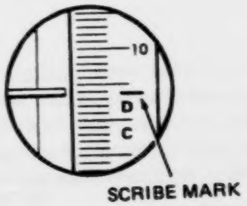
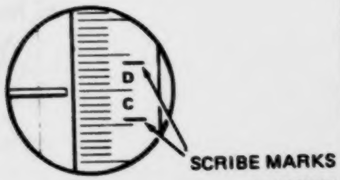
(1) Locating Top Dead Center (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
2 (cont)		 TWO VALVE KEEPERS NO. 1 CYLINDER INTAKE VALVE SPRING SCREWDRIVER TA127081		
		f. Retainer, valve spring, and seat for No. 1 cylinder intake valve	Remove	Lift from cylinder head
		 RETAINER SPRING SEAT TA127082		
		NOTE Do not remove seal from valve stem. If seal is removed, valve may fall through valve guide if piston is moved too far, requiring removal of cylinder head.		
		g. Dial indicator	Position	On end of valve stem, with valve resting on top of No. 1 piston

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(1) Locating Top Dead Center (cont).

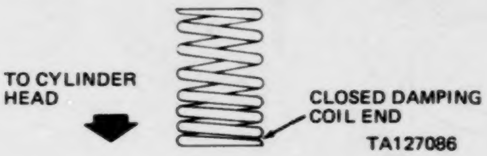
STEP	LOCATION	ITEM	ACTION	REMARKS
2 (cont)		 TA127083		
		h. Dial indicator	Zero	Rotate engine flywheel clockwise until dial indicator hand stops moving, then reset dial indicator to read zero
		i. Engine flywheel	Rotate clockwise	Until dial indicator reads 0.010 inch. Scribe a mark on flywheel in line with timing pointer as shown  TA127084
		j. Engine flywheel	Rotate counter-clockwise	Past dial indicator zero, until dial indicator reads 0.010 inch. Scribe another mark on flywheel in line with timing pointer. Half the distance between these two scribe marks is TDC for No. 1 cylinder  TA127085

3-5. ENGINE MAINTENANCE (cont)

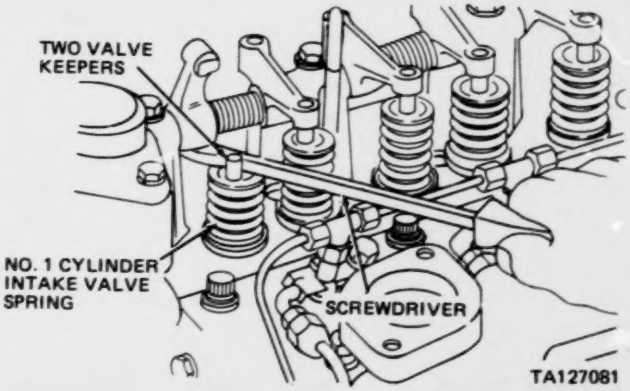
a. Engine Tune-up (cont).

(1) Locating Top Dead Center (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
2 (cont)		k. Seal	Remove	From valve stem
		l. Seat, valve spring and retainer	Install	Position spring with closed damping coil end on top of cylinder head as shown


TO CYLINDER HEAD
CLOSED DAMPING COIL END
TA127086

STEP	LOCATION	ITEM	ACTION	REMARKS
		m. Two valve keepers and new seal	Install	Compress valve spring using screwdriver as shown, install new seal in lower groove of valve stem, install two keepers in upper groove of valve stem, and slowly release screwdriver. Gently tap end of valve stem to seat keepers


TWO VALVE KEEPERS
NO. 1 CYLINDER INTAKE VALVE SPRING
SCREWDRIVER
TA127081

STEP	LOCATION	ITEM	ACTION	REMARKS
		n. Push rod for No. 1 cylinder intake valve	Install	Push rocker arm down against valve spring and push rearwards off valve stem, lower push rod into bore in cylinder head, release rocker arm, and position push rod beneath rocker arm adjusting screw
		o. No. 1 cylinder intake valve	Adjust tappet clearance	Para 3-5a(2)

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(2) Valve Tappet Clearance Adjustment.

This task covers adjustment of tappet clearance for engine intake and exhaust valves.

INITIAL SETUP

TOOLS

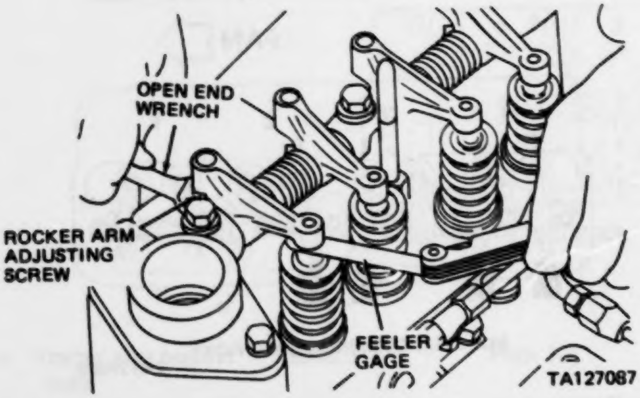
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Extension Wrench	FSCM 10988 P/N M20419

MATERIALS/PARTS
No. 30 engine oil
Rocker arm cover gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Left side panel removed.
2-53d	Top hood removed.
3-5a(1)	Engine positioned at TDC for No. 1 cylinder.
3-5i	Rocker arm cover removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
TAPPET ADJUSTMENT — COLD SETTING				
1		**NOTE** The cold setting valve tappet clearance must be adjusted whenever arms or push rods have been removed. Do not attempt to start engine until cold setting tappet clearance adjustment has been performed.		
		a. Rocker arm adjusting screw for No. 1 cylinder intake valve	Adjust	Loosen adjusting screw until a 0.012 inch feeler gage can be placed between rocker arm and valve stem as shown, then turn adjusting screw clockwise until rocker arm-to-valve stem clearance is 0.012 inch



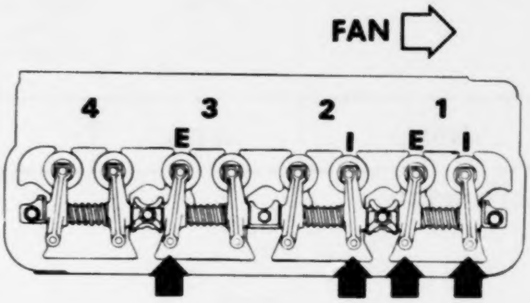
3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(2) Valve Tappet Clearance Adjustment (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TAPPET ADJUSTMENT — COLD SETTING				
1 (cont)		b. Rocker arm adjusting screws	Adjust	Repeat step a above to adjust intake and exhaust valves as pointed out by arrows below

TAPPET CLEARANCE – INTAKE VALVES 0.012 INCH
EXHAUST VALVES 0.014 INCH

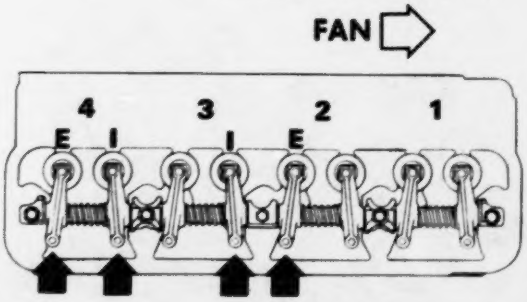


NO. 1 TDC COMPRESSION STROKE

TA127088

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Engine flywheel	Rotate clockwise	Rotate engine one complete revolution until pointer in timing hole is in line with TDC mark on flywheel (TDC position for No. 4 cylinder)
		d. Rocker arm adjusting screws	Adjust	Repeat step a above to adjust intake and exhaust valves as pointed out by the arrows below

TAPPET CLEARANCE – INTAKE VALVES 0.012 INCH
EXHAUST VALVES 0.014 INCH



NO. 4 TDC COMPRESSION STROKE

TA127089

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Valve stems	Lubricate	Squirt oil through valve springs to lubricate stems before starting engine

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(2) Valve Tappet Clearance Adjustment (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TAPPET ADJUSTMENT — COLD SETTING (cont)				
1 (cont)		f. Oil pressure	Check	Start engine and check OIL PRESSURE gage for normal indication. Visually check rocker arms to insure that they are receiving oil, then stop engine
		g. Valve tappet clearance-hot setting	Adjust	Proceed to step 2 below
TAPPET ADJUSTMENT — HOT SETTING				
2		a. Rocker arm cover	Install	Para 3-5i
		b. Engine	Warm-up	Start engine and operate (under load if possible) approximately one hour; then stop engine
		c. Rocker arm cover	Remove	Para 3-5i

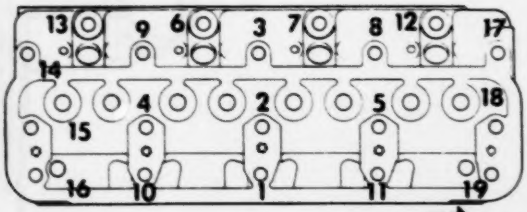
NOTE

Engine must be at normal operating temperature for each of the following steps. If necessary, restart and run engine to maintain normal operating temperature.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Cylinder head nuts and bolts	Retorque	Loosen bolt shown in position 1 approximately 1/4 turn, then tighten to 110-115 pounds foot torque. Using same procedure, retorque each cylinder head nut and bolt in sequence shown

NOTE

Use extension wrench to torque nuts in positions 4 and 5.



BOLT TORQUE SEQUENCE

TA127090

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Rocker arm bracket bolts	Retorque	Para 3-5j
		f. Rocker arm adjusting screws	Adjust	Repeat step 1 with engine at normal operating temperature
		g. Rocker arm cover	Install	Para 3-5i

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(3) Fuel Injection Pump Adjustments.

This task covers adjustment of fuel injection pump timing, engine idle speed, and no-load governed speed.

INITIAL SETUP

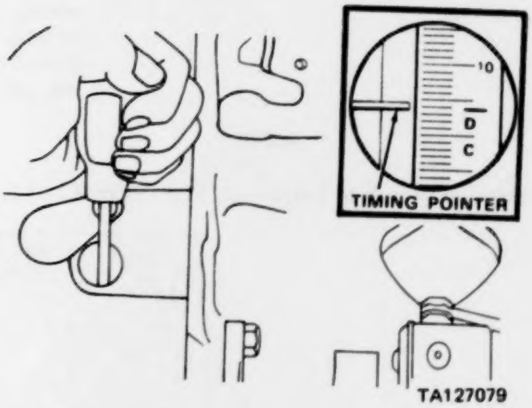
TOOLS	
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

MATERIALS/PARTS
Wire seal
Timing window gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Left and right side panels removed.
3-5f	Tachometer drive cover removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
INJECTION PUMP — TIMING ADJUSTMENT				
1	Engine compartment	a. Engine flywheel	Rotate	Engage flywheel ring gear teeth with blade of screwdriver as shown. Rotate engine counterclockwise until pointer in timing hole is past 8° BTDC mark on flywheel; then rotate engine clockwise until pointer is in line with 8° BTDC mark on flywheel

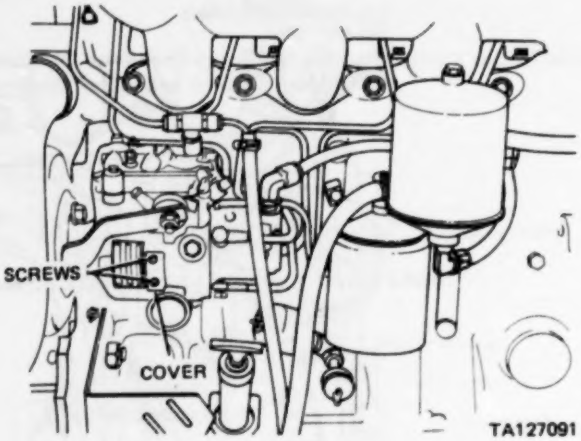
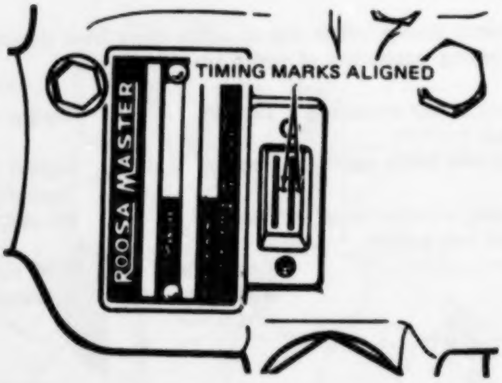


STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Timing window screws, cover and gasket	Remove	

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

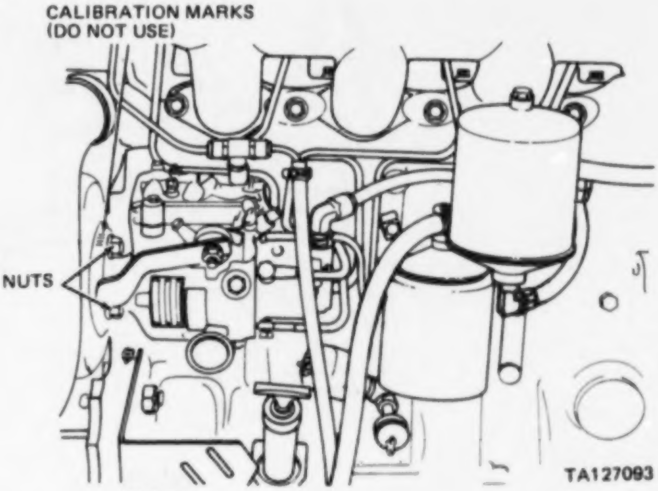
(3) Fuel Injection Pump Adjustments (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INJECTION PUMP — TIMING ADJUSTMENT (cont)				
1 (cont)		 TA127091		
		NOTE If both timing marks are not visible in the following step, rotate engine one complete revolution and repeat step a above.		
		c. Injection pump timing marks	Check	If timing marks are aligned as shown, proceed to step h. If marks are not aligned, proceed to step d
		 TA127092		
		d. Three pump mounting nuts	Loosen	

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

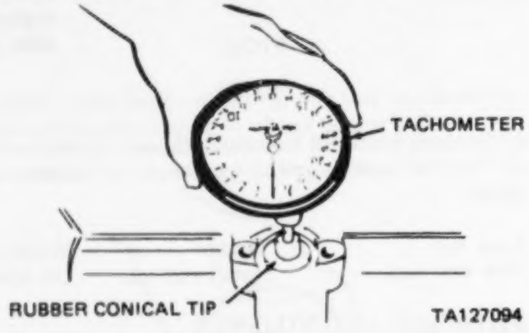
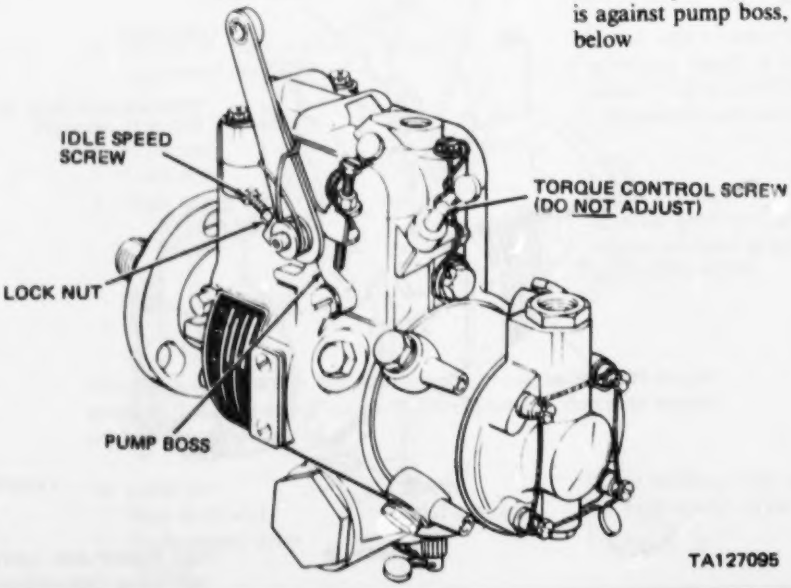
(3) Fuel Injection Pump Adjustments (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INJECTION PUMP — TIMING ADJUSTMENT (cont)				
1 (cont)				
		NOTE Do not use calibration marks in the following step. Use marks in injection pump timing window only.		
		e. Injection pump	Rotate	Until timing marks in timing window are in line
		NOTE To advance timing, rotate top of pump away from engine. To retard timing, rotate top of pump toward engine.		
		f. Three pump mounting nuts	Tighten	Torque to 35-42 pounds foot torque
		g. Injection pump timing	Recheck	Repeat steps a and c above until timing marks are in line
		h. Timing window cover and new gasket	Position	On injection pump
		i. Cover screws	Install and tighten	Until timing window cover is securely mounted
ENGINE IDLE SPEED ADJUSTMENT				
2	Fuel injection pump	a. Engine	Warm-up	Start engine and operate until normal operating temperature is reached
		b. Tachometer	Position	With engine idling, press conical tip against tachometer drive shaft on engine until tachometer hand stops moving, then note reading

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

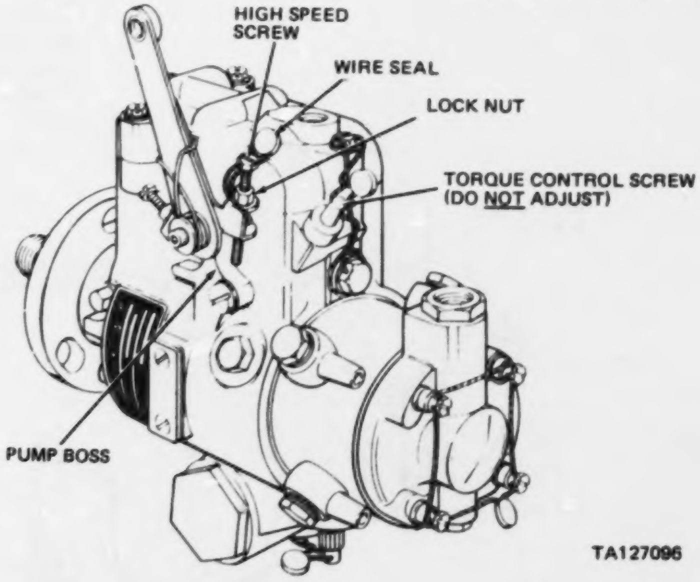
(3) Fuel Injection Pump Adjustments (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ENGINE IDLE SPEED ADJUSTMENT (cont)				
2 (cont)		**NOTE** Tachometer drive shaft operates at one half engine speed. Double tachometer reading to obtain engine RPM.  TACHOMETER RUBBER CONICAL TIP TA127094		
		c. Engine idle speed	Measure	Repeat step b above to recheck idle speed. If engine idle speed is 825-850 RPM, proceed to step 3. If idle speed is not correct, proceed to step d.
		d. Idle speed screw	Check position	With accelerator pedal at idle position, check if idle speed screw is against the injection pump boss. If screw is not against pump boss, adjust accelerator cable ball joint (para 2-15i). If idle screw is against pump boss, proceed to step e below
		 IDLE SPEED SCREW TORQUE CONTROL SCREW (DO NOT ADJUST) LOCK NUT PUMP BOSS TA127095		

3-5. ENGINE MAINTENANCE (cont)

a. Engine Tune-up (cont).

(3) Fuel Injection Pump Adjustments (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ENGINE IDLE SPEED ADJUSTMENT (cont)				
2 (cont)		e. Idle speed screw wire seal	Cut and remove	
		f. Lock nut	Loosen	
		g. Idle speed screw	Adjust	Adjust 1/2 turn at a time and recheck engine idle speed. Repeat until engine idles at 825-850 RPM
		NOTE Turn idle speed screw out (counterclockwise) to decrease engine speed. Turn idle speed screw in (clockwise) to increase engine idle speed.		
		h. Lock nut	Tighten	While holding idle speed screw
		i. New wire seal	Install and seal	On idle speed screw
ENGINE NO-LOAD GOVERNED SPEED ADJUSTMENT				
3	Fuel injection pump	a. High speed screw	Check	Check if high speed screw is against the injection pump boss while an assistant fully depresses the accelerator pedal. If screw is not against pump boss, adjust accelerator cable ball joint (para 2-15i)
		 HIGH SPEED SCREW WIRE SEAL LOCK NUT TORQUE CONTROL SCREW (DO NOT ADJUST) PUMP BOSS TA127096		
		b. Engine	Warm-up	Start engine and operate until normal operating temperature is reached

3-5. ENGINE MAINTENANCE (cont)

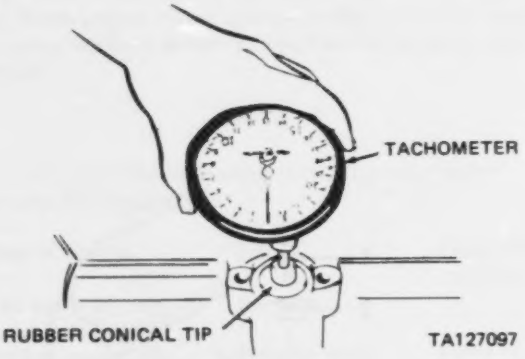
a. Engine Tune-up (cont).

(3) Fuel Injection Pump Adjustments (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ENGINE NO-LOAD GOVERNED SPEED ADJUSTMENT (cont)				
3 (cont)		c. Tachometer	Position	With accelerator pedal fully depressed, press conical tip against tachometer drive shaft on engine until tachometer hand stops moving, then note reading

NOTE

Tachometer drive shaft operates at one half engine speed. Double tachometer reading to obtain engine RPM.



STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Engine no-load governed speed	Measure	Repeat step c above to recheck no-load governed speed. If no-load governed speed is 2230-2270 RPM, proceed to step j. If speed is not correct, proceed to step e.
		e. Wire seal	Cut and remove	
		f. Lock nut	Loosen	
		g. High speed screw	Adjust	Adjust 1/2 turn at a time and recheck no-load governed speed. Repeat until engine no-load governed speed is 2230-2270 RPM

NOTE

Turn high speed screw out (counterclockwise) to increase engine speed. Turn high speed screw in (clockwise) to decrease engine no-load governed speed.

STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Lock nut	Tighten	While holding high speed screw
		i. New wire seal	Install and seal	On high speed screw
		j. Tachometer drive cover	Install	Para 3-5f

3-5. ENGINE MAINTENANCE (cont)

b. Engine Mount.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

TOOLS

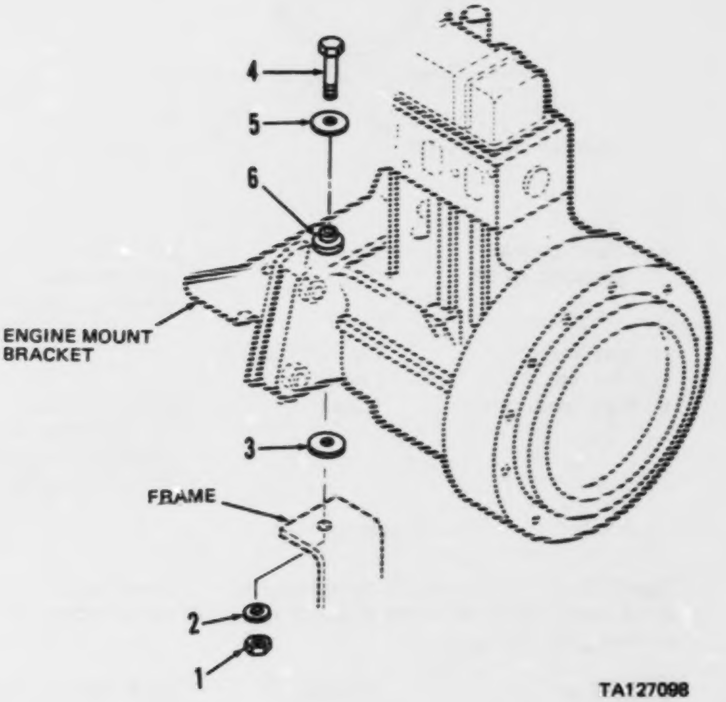
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
One-ton Sling and Hoist
Sleeve, 1-1/2 inches diameter by 1 inch long
5/8-11NC hex nut

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Rubber mount
Lock nut

EQUIPMENT CONDITION

Paragraph	Condition Description
2-17c	Radiator shroud (with radiator and oil cooler still attached) removed.



KEY
1. Lock nut
2. Washer
3. Washer
4. Cap screw
5. Washer
6. Mount

3-5. ENGINE MAINTENANCE (cont)

b. Engine Mount (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
1	Engine, rear	Engine mount (6)	Inspect	Replace if cracked, chipped, or split
REMOVAL				
2	Engine, rear	a. Lock nut (1) and washer (2)	Loosen and remove	Discard lock nut (1)

WARNING

Keep hands and body clear while engine is being raised. Failure to do so could cause serious injury or death due to engine falling. When engine mount bracket is clear of frame, support engine using blocks to prevent engine from falling while replacing mount (6).

NOTE

Loosen two transmission mounts mounting bolts before performing following step.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Rear of engine	Lift	Using sling and hoist. Lift until mount (6) will clear frame and engine mount bracket
		c. Cap screw (4) and washers (3 and 5)	Remove	
		d. Rubber mount (6)	Remove and discard	From engine mount bracket
CLEANING				

WARNING

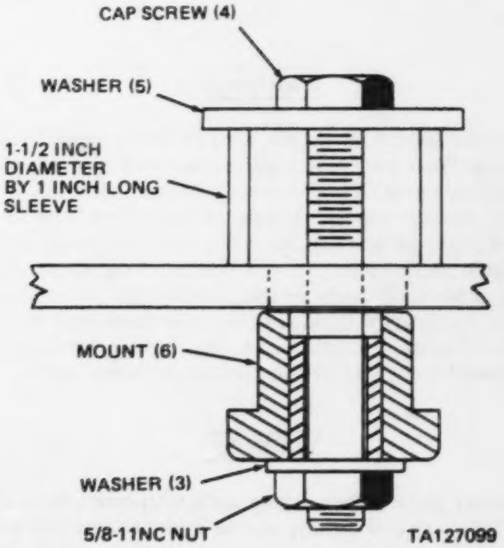
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

3-5. ENGINE MAINTENANCE (cont)

b. Engine Mount (cont).

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">CLEANING (cont)</td></tr>
<tr><td>3</td><td></td><td>Washers (2, 3 and 5) cap screw (4) and engine mount bracket</td><td>Clean</td><td>Use cleaning solvent P-D-680. Dry thoroughly with compressed air or clean cloths</td></tr>
<tr><td colspan="5">INSPECTION</td></tr>
<tr><td>4</td><td></td><td>Washers (2, 3 and 5) and cap screw (4)</td><td>Inspect</td><td>Replace if worn, or if threads damaged</td></tr>
<tr><td colspan="5">INSTALLATION/REPLACEMENT</td></tr>
<tr><td>5</td><td>Engine, rear</td><td>a. New mount (6) and hole in engine mount bracket</td><td>Lubricate</td><td>Use rubber lubricant or liquid soap</td></tr>
<tr><td colspan="5">CAUTION
Do not attempt to install mount (6) using hammer. Driving mount into engine mount bracket may damage rubber.</td></tr>
<tr><td></td><td></td><td>b. Mount (6)</td><td>Install</td><td>Using hardware shown below, pull mount until it is seated against engine mount bracket, then remove hardware</td></tr>
<tr><td colspan="5">

CAP SCREW (4)
WASHER (5)
1-1/2 INCH DIAMETER BY 1 INCH LONG SLEEVE
MOUNT (6)
WASHER (3)
5/8-11NC NUT

 TA127099</td></tr>
</table>

3-5. ENGINE MAINTENANCE (cont)

b. Engine Mount (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
5 (cont)		c. Washer (3)	Position	On frame, with holes aligned

WARNING

Keep hands and body clear while engine is being lowered. Failure to do so could cause serious injury or death due to engine falling.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Rear of engine	Lower	Remove support blocks and lower using hoist. Be sure mount (6), washer (3) and frame holes are aligned
		e. Washers (2 and 5), cap screw (4) and new lock nut (1)	Install and tighten	
		f. Two transmission mounts mounting bolts	Tighten	
		g. Radiator shroud, with radiator and oil cooler	Install	Para 2-17c

3-5. ENGINE MAINTENANCE (cont)

c. Power Pack.

This task covers power pack (engine/transmission) removal and installation.

INITIAL SETUP

TOOLS		MATERIALS/PARTS
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654	Cleaning solvent P-D-680
One-ton Sling and Hoist		Clean cloths
		Drain pans
		Lock nuts

EQUIPMENT CONDITION

Location	Paragraph	Condition Description

NOTE

Prepare equipment for power pack removal in the following order.

Location	Paragraph	Condition Description
Rear chassis, grille and battery compartment	2-53a	Tow bar lowered and grille removed.
	2-33b	Battery ground cable disconnected.

WARNING

Disconnect battery ground cable before proceeding.

Location	Paragraph	Condition Description
Rear chassis, top and sides	2-53c	Side panels removed.
	2-16	Exhaust pipe removed.
	2-53d	Top hood removed.
	2-15d	Air cleaner removed.
	2-53b	Fenders removed.
	2-53e	Hood panels removed.
Rear chassis, front	2-53f	Front cover panel removed.
	2-56g(1)	Hydraulic reservoir drained.
Engine compartment, rear	2-17a	Radiator and engine coolant drained.
	2-17b	Radiator hoses removed.
	2-38f	Oil cooler hoses disconnected from oil cooler.
	2-17c	Radiator shroud (with radiator and oil cooler still attached) removed.
	2-56g(5)	Hydraulic reservoir removed.
Transmission, front	2-42a	Parking brake cable disconnected.
	2-39b	Center drive shaft assembly disconnected.
	2-39c	Rear drive shaft assembly disconnected.
Transmission, left side	2-31b	Neutral start switch and back-up alarm switch leads disconnected.
	2-38b	Transmission linkage cables disconnected.
	2-43d	Declutch valve outlet hose disconnected.
Engine, left side	2-26	Alternator leads disconnected.
	2-27a	Battery cables, slave receptacle cables and harness leads disconnected from starter and solenoid switch.
	2-27b	Starter relay and 25 AMP circuit breaker leads disconnected.
	2-31c(1)	Engine temperature switch lead disconnected.

3-5. ENGINE MAINTENANCE (cont)

c. Power Pack (cont).

Engine compartment, left side	2-56g(2)	Hydraulic oil filter and filler head removed.
Engine compartment, right side		Fuel tank shut-off valve closed.
Transmission, right side	2-31c(2)	Transmission temperature switch lead disconnected.
	2-38f	Oil cooler hoses disconnected.
	2-48b(2)	Hydraulic pump hoses disconnected.
Engine, right side	2-15b, 2-15c(2)	Fuel lines disconnected from fuel filters.
	2-15c(1)	Fuel return line disconnected from fuel injector tee fitting.
	2-15d, 2-15h	Restriction indicator and cold start kit lines disconnected from intake manifold.
	2-15i	Accelerator ball joint and cable disconnected from fuel injection pump.
	2-16	Muffler and muffler bracket removed.
	2-31d	Engine oil pressure switch and sending unit leads disconnected.
	2-39e(2)	Rear axle breather removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment	a. One-ton sling and hoist	Connect	To engine and transmission; take up slack
		b. Two lock nuts (1) and washers (2)	Loosen and remove	Discard lock nut (1)
		c. Two cap screws (3)	Lift and remove	If necessary, gently tap threaded end of cap screw using hammer
		d. Lock nut (4) and washers (5 and 6)	Loosen and remove	Discard lock nut (4)
		e. Cap screw (7) and washer (8)	Lift and remove	If necessary, gently tap threaded end of cap screw using hammer
		f. Rubber motor mount (16)	Remove	
		g. Eight cap screws (13) and washers (14)	Remove	
		h. Two transmission mounts (15)	Remove	

WARNING

Keep clear of engine and transmission during power pack removal. Never place hands or body under power pack. Failure to do so may cause serious bodily injury or death due to power pack falling.

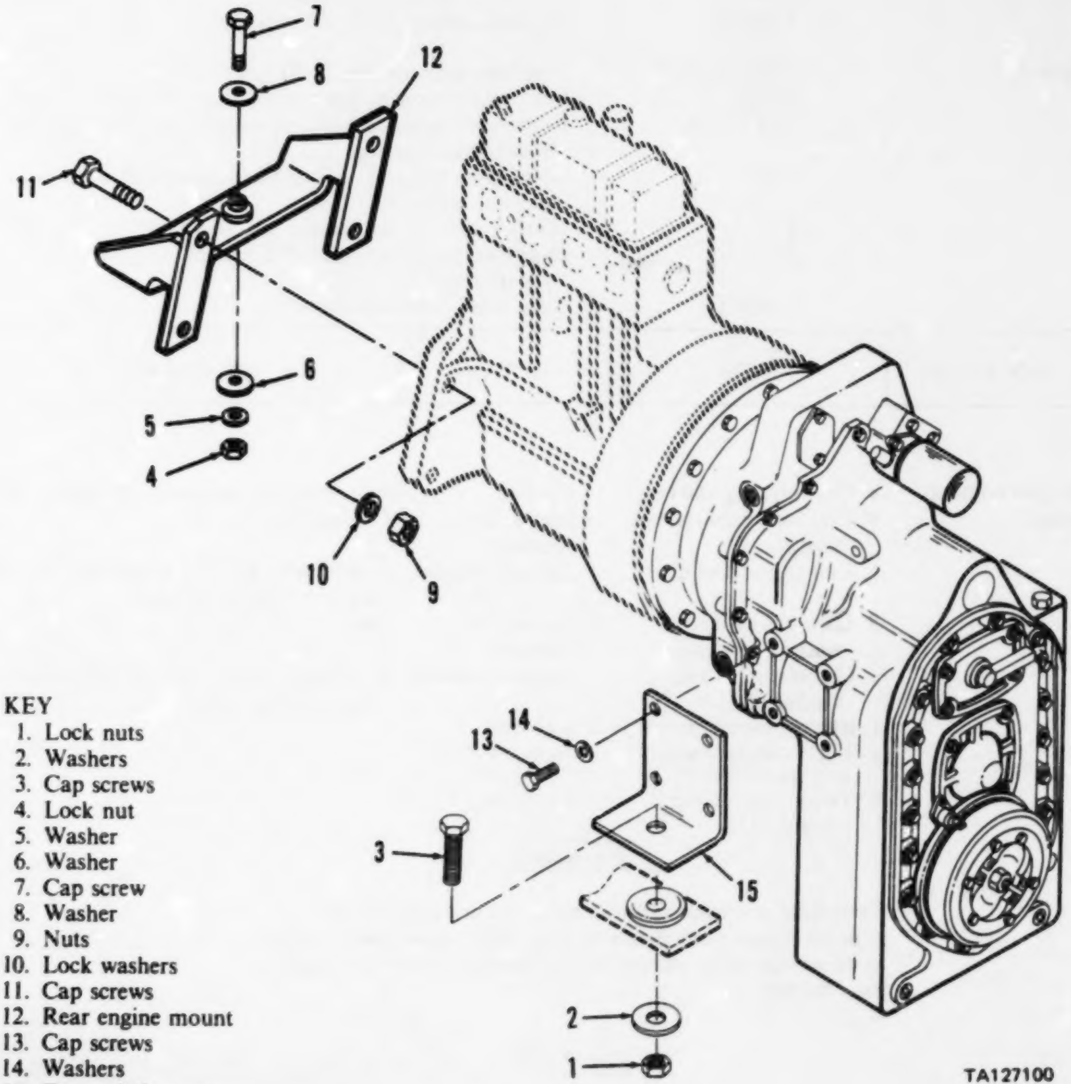
CAUTION

Check that all hoses, lines and wires are disconnected as the power pack is lifted from vehicle. If necessary, lower power pack onto mounts and disconnect remaining hoses, lines or wires.

STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Power pack	Slowly lift and remove	From rear chassis

3-5. ENGINE MAINTENANCE (cont)

c. Power Pack (cont).


7
8
12
11
6
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4
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14
13
3
15
2
1
TA127100

KEY
1. Lock nuts
2. Washers
3. Cap screws
4. Lock nut
5. Washer
6. Washer
7. Cap screw
8. Washer
9. Nuts
10. Lock washers
11. Cap screws
12. Rear engine mount
13. Cap screws
14. Washers
15. Transmission mounts

3-5. ENGINE MAINTENANCE (cont)

c. Power Pack (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2	Engine, rear			

NOTE

Perform the following steps only if rear engine mount (12) requires replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		a. Four nuts (9), lock washers (10) and cap screws (11)	Loosen and remove	Support engine mount (12)
		b. Engine mount (12)	Remove	
INSTALLATION				
3	Engine, rear	a. Rear engine mount (12)	Position	
		b. Four cap screws (11), lock washers (10) and nuts (9)	Install and tighten	Tighten to 150-180 ft. lb. torque.
4	Engine compartment			

WARNING

Keep clear of engine and transmission during power pack installation. Never place hands or body under power pack. Failure to do so may cause serious injury or death due to power pack falling.

CAUTION

Check that all hoses, lines and wires are clear as power pack is slowly lowered into vehicle. If necessary, reposition hoses, lines or wires before installing power pack.

STEP	LOCATION	ITEM	ACTION	REMARKS
		a. Power pack	Slowly lower and install	Into rear chassis, with mounting holes aligned
		b. Two transmission mounts (15)	Position	
		c. Eight washers (14) and cap screws (13)	Install	
		d. Rubber motor mounts (16)	Install	
		e. Washer (8) and cap screw (7)	Install	
		f. Washers (6 and 5) and new lock nut (4)	Install and tighten	Until bottom of rubber engine mount (16) expands to same diameter as washer (6)
		g. Two cap screws (3), washers (2) and new lock nuts (1)	Install and tighten	Until bottom of rubber mounts expand to same diameter as washers (2)

3-5. ENGINE MAINTENANCE (cont)

d. Separation of Engine and Transmission.

This task covers:
a. Removal of transmission from engine
b. Installation of transmission on engine

INITIAL SETUP

TOOLS
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
One 3/8-24 NF by 4 inches guide stud

EQUIPMENT CONDITION

Paragraph	**Condition Description**
3-5c	**Power pack (engine/transmission) removed from vehicle.**

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission	Transmission supports	Install as shown	To support transmission in upright position after removal from engine
2	Engine flywheel housing	a. Three cap screws (1), lock washers (2) and washers (3)	Remove	Support dust cover (4)
		b. Dust cover (4)	Remove	
		c. Eight cap screws (5)	Loosen and remove	Reach in flywheel housing opening and remove screws (5) securing flex plate to flywheel. Rotate flywheel at crankshaft pulley as required, to reach all eight cap screws. Hold crankshaft pulley stationary (use 1/2" drive wrench) while removing cap screws (5).
3.	Transmission	a. Sling and hoist	Connect	To transmission
		b. Ten cap screws (7) and lock washers (8)	Remove	Support transmission with hoist
		c. Two nuts (6) and lock washers (8)	Remove	From left side of transmission
		d. Transmission	Remove	Slide rearward from flywheel housing until flex plate clears housing, then lift and remove

NOTE

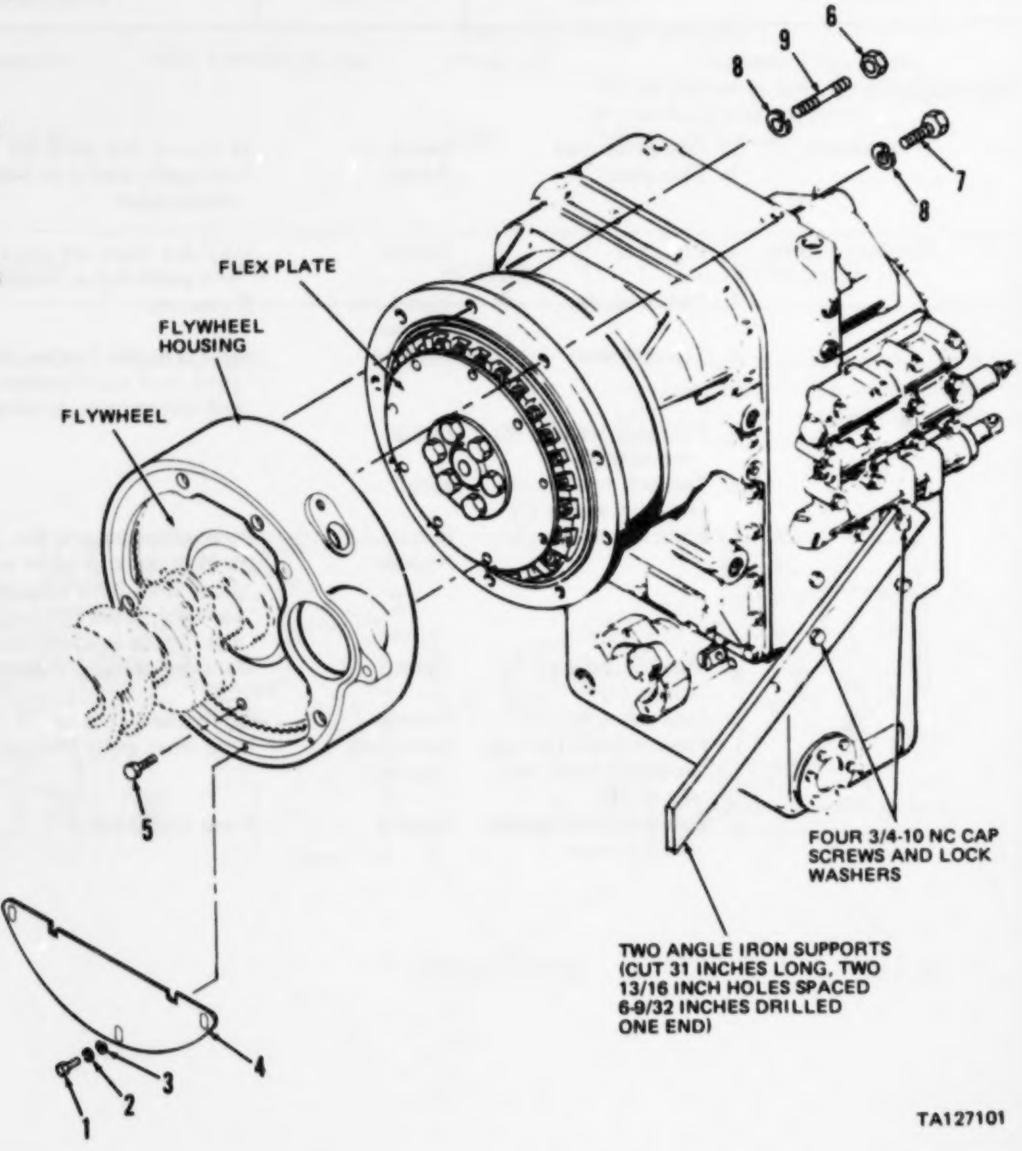
Remove studs (9) only if required for replacement.

3-5. ENGINE MAINTENANCE (cont)

d. Separation of Engine and Transmission (cont).

KEY

1. Cap screws
2. Lock washers
3. Washers
4. Dust cover
5. Cap screws
6. Nuts
7. Cap screws
8. Lock washers
9. Studs


6
9
8
7
8
FLEX PLATE
FLYWHEEL HOUSING
FLYWHEEL
5
FOUR 3/4-10 NC CAP SCREWS AND LOCK WASHERS
TWO ANGLE IRON SUPPORTS (CUT 31 INCHES LONG, TWO 13/16 INCH HOLES SPACED 6-9/32 INCHES DRILLED ONE END)
4
3
2
1
TA127101

3-5. ENGINE MAINTENANCE (cont)

d. Separation of Engine and Transmission (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
4	Transmission	a. One guide stud	Install	In a lower flex plate nut
		b. Flex plate	Rotate	Until guide stud is at bottom center of transmission
5	Flywheel housing	a. Flywheel	Rotate	Until flex plate cap screw hole is aligned with guide stud at bottom of transmission
		b. Two studs (9)	Install and tighten	If removed
		c. Transmission	Position	Against engine flywheel housing. Align guide stud with flywheel, and studs (9) and transmission housing
		d. Two lock washers (8) and nuts (6)	Install	
		e. Ten lock washers (8) and cap screws (7)	Install	
		f. Eight cap screws (5)	Install and tighten	Rotate flywheel and flex plate and install at least one cap screw before removing guide stud. After all eight cap screws are snug, rotate flywheel and flex plate and tighten to 25-30 pounds foot torque
		g. Nuts (6) and cap screws (7)	Tighten	Until transmission is securely mounted
		h. Dust cover (4)	Position	On flywheel housing
		i. Three washers (3), lock washers (2) and cap screws (1)	Install and tighten	Until cover (4) is securely mounted
		j. Transmission supports and hardware	Remove	From transmission

3-5. ENGINE MAINTENANCE (cont)

e. Cylinder Block.

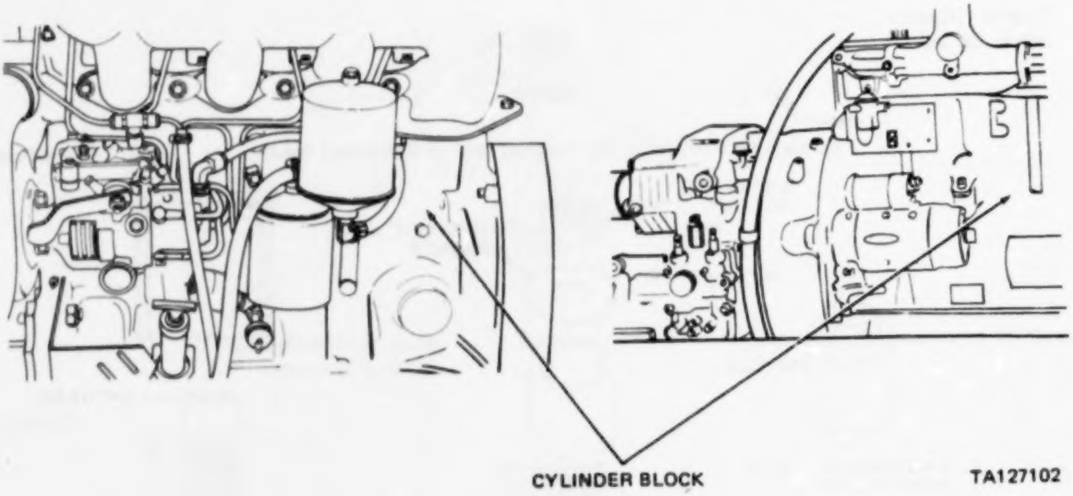
This task covers cylinder block inspection.

INITIAL SETUP

TOOLS		EQUIPMENT CONDITION	
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641	Paragraph	Condition Description
			Vehicle parked on level surface, engine off, and parking brake applied.
		2-53c	Side panels removed.

MATERIALS/PARTS
None

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Engine compartment	Cylinder block	Inspect	Notify general support maintenance if expansion plug eroded, or if cylinder block is cracked, damaged, or shows signs of wear or strain



3-5. ENGINE MAINTENANCE (cont)

f. Tachometer Drive.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

SPECIAL TOOLS

Tachometer drive removal tool	See removal note

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

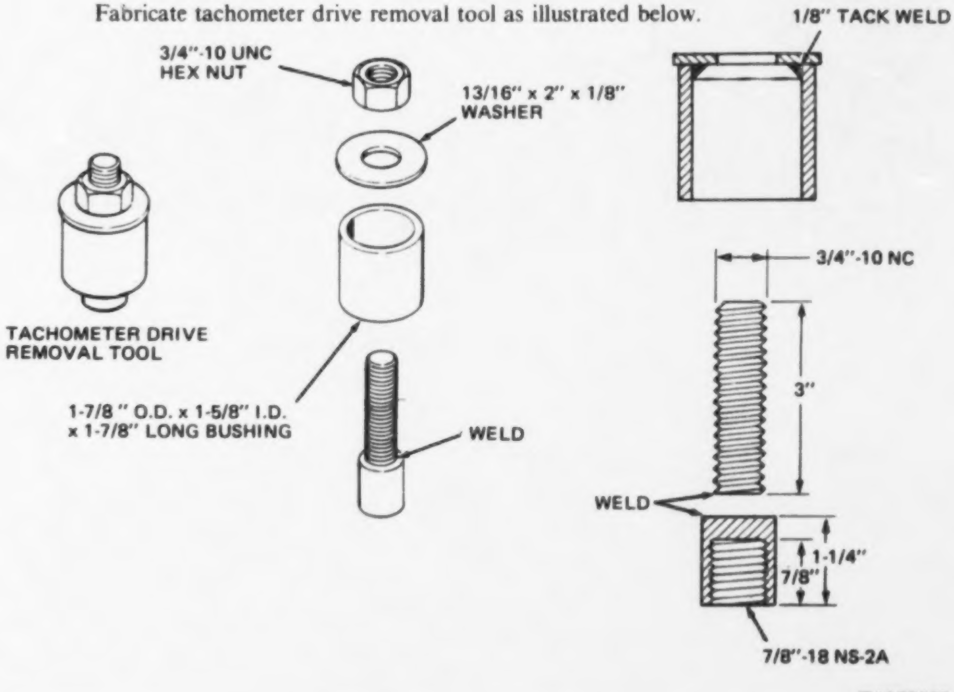
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Left side panel removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, left side			

NOTE

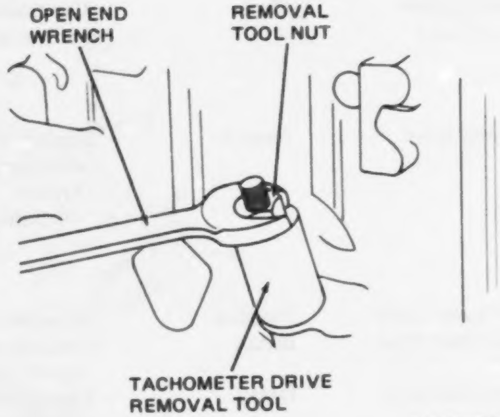
Fabricate tachometer drive removal tool as illustrated below.


1/8" TACK WELD
3/4"-10 UNC HEX NUT
13/16" x 2" x 1/8" WASHER
TACHOMETER DRIVE REMOVAL TOOL
1-7/8" O.D. x 1-5/8" I.D. x 1-7/8" LONG BUSHING
WELD
3/4"-10 NC
3"
WELD
1-1/4"
7/8"
7/8"-18 NS-2A
TA127103

3-5. ENGINE MAINTENANCE (cont)

f. Tachometer Drive (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
1 (cont)		a. Tachometer drive cover	Remove	Turn counterclockwise and lift from tachometer drive
		b. Tachometer drive removal tool	Install	Turn clockwise on tachometer drive threads
		c. Removal tool nut	Tighten	Use open end wrench. Turn nut clockwise as shown until tachometer drive is pulled from engine



TA127104

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Tachometer drive removal tool	Remove	Turn counterclockwise and lift from tachometer drive
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

3-5. ENGINE MAINTENANCE (cont)

f. Tachometer (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
1 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
2		Tachometer drive	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
3		Tachometer drive	Inspect	Replace if body cracked or threads damaged, drive gear teeth chipped or broken, or if drive shaft or bushings excessively worn
INSTALLATION				
4	Engine compartment, left side	a. Tachometer drive	Position	In engine block hole
		b. Tachometer drive	Install	Carefully tap with soft-faced hammer until top of body is flush with engine block
		c. Tachometer drive cover	Install	Turn clockwise on tachometer drive threads until hand-tight

3-5. ENGINE MAINTENANCE (cont)

g. Cylinder Head.

This task covers cylinder head inspection, replacement and repair.

INITIAL SETUP

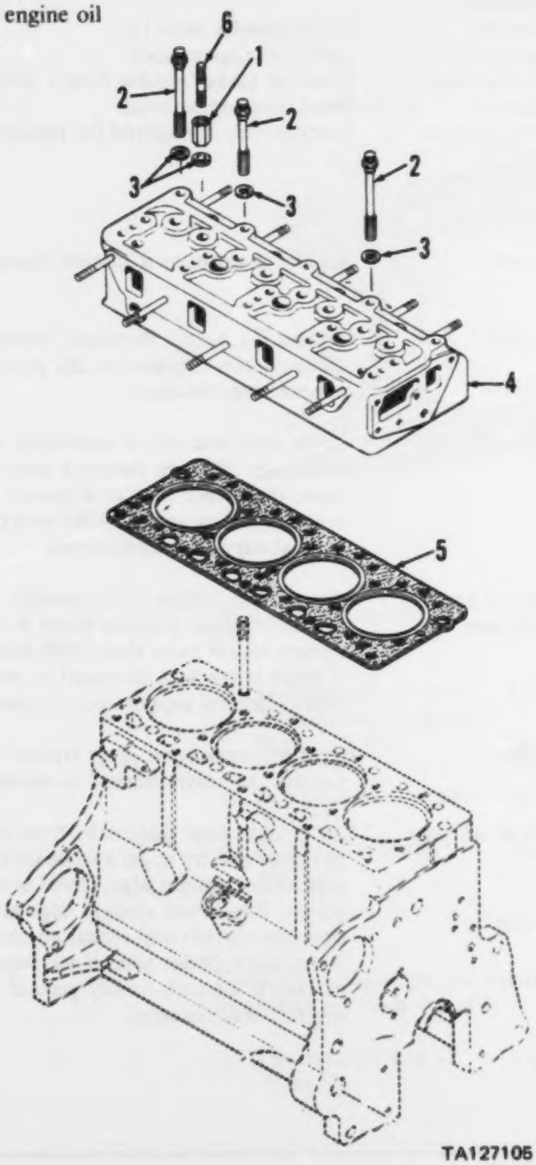
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0650
Extension Wrench	FSCM 10988 P/N M20419

MATERIALS/PARTS
- Clean cloths
- No. 30 engine oil
- Gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Side panels removed.
2-53d	Top hood removed.
2-16	Spark arresting muffler removed.
2-14d	Intake manifold removed.
2-14e	Exhaust manifold removed.
2-17e	Water pump removed.
2-31c(1)	Engine temperature switch removed.
3-5i	Rocker arm cover removed.
3-5j	Rocker arm assembly removed.
3-6b	Fuel injectors removed.



KEY
1. Stud nuts
2. Bolts
3. Washers
4. Cylinder head
5. Gasket
6. Rocker arm cover studs

TA127105

3-5. ENGINE MAINTENANCE (cont)

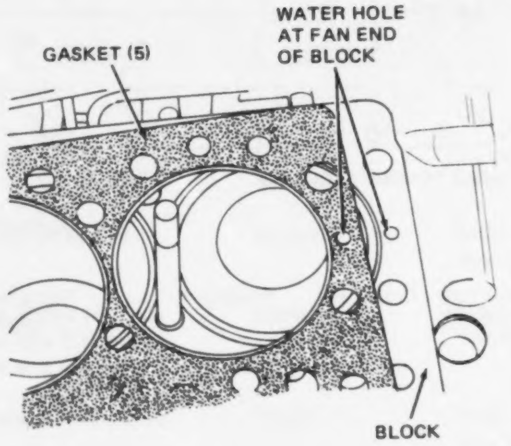
g. Cylinder Head (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Cylinder head (4) top	a. Two stud nuts (1)	Loosen and remove	Remove nut (1) and stud (6) as an assembly
		b. 17 bolts (2)	Loosen and remove	
		c. 19 washers (3)	Remove	From cylinder head (4)
		d. Cylinder head (4)	Remove	Lift from engine block
		e. Gasket (5)	Remove and discard	Clean all gasket residue from cylinder head and engine block
		f. Two studs (6)	Remove from nut (1)	Remove only if required for replacement
INSPECTION/REPAIR				
2		Nuts (1), bolts (2), washers (3) and studs (6)	Inspect	Replace if worn, or if threads damaged
3		Pistons	Inspect	Replace if cracked, damaged, scored, and clean carbon deposits (notify general support maintenance)
4		Cylinder block sleeves	Inspect	Check taper and out-of-roundness with bore gage. Replace sleeves if taper is more than 0.002 inch or if out-of-roundness is more than 0.001 inch (notify general support maintenance)
5		Cylinder block top surface	Inspect and measure	Measure top surface using straight edge and feeler gage. Replace block if top surface varies more than 0.002 inch, or if block is cracked, damaged or eroded (notify general support maintenance)
6		Cylinder head (4)	Inspect	Replace if expansion plugs eroded, head cracked, or valves burned or damaged
7		Cylinder head bottom surface	Check warpage	Lay straight edge diagonally from corner to corner and try to get a 0.006 inch feeler gage under straight edge. Check at several points. Reposition straight edge at opposite corners and repeat checks. Resurface cylinder head if warpage exceeds 0.006 inch (notify general support maintenance)

3-5. ENGINE MAINTENANCE (cont)

g. Cylinder Head (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
8	Cylinder block, top	a. New gasket (5)	Position	On cylinder block, with water hole on gasket aligned with water hole at fan end of block as shown



TA127106

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Cylinder head (4)	Position	Slide cylinder head over the cylinder block and studs, and lower onto aligning dowels until resting on cylinder block
		c. Two nuts (1), 17 bolts (2) and two studs (6)	Lubricate	Lightly coat with oil
		d. Two studs (6)	Install and tighten	Until securely mounted to nuts (1)
		e. Two washers (3) and nuts (1)	Install	On cylinder block studs
		f. 17 washers (3) and bolts (2)	Install	

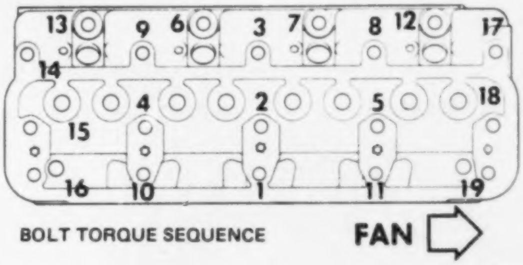
NOTE

In the following steps, use extension wrench to torque nuts (1) located at positions 4 and 5.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Two nuts (1) and 17 bolts (2)	Tighten	Tighten to 55 pounds foot torque in sequence shown

3-5. ENGINE MAINTENANCE (cont)

g. Cylinder Head (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
8 (cont)		 13 9 6 3 7 8 12 17 14 4 2 5 18 15 16 10 1 11 19 FAN BOLT TORQUE SEQUENCE TA127090		
		h. Two nuts (1) and 17 bolts (2)	Retighten	Using same sequence, tighten to 110-115 pounds foot torque

3-5. ENGINE MAINTENANCE (cont)

h. Flywheel Housing.

This task covers flywheel housing inspection.

INITIAL SETUP

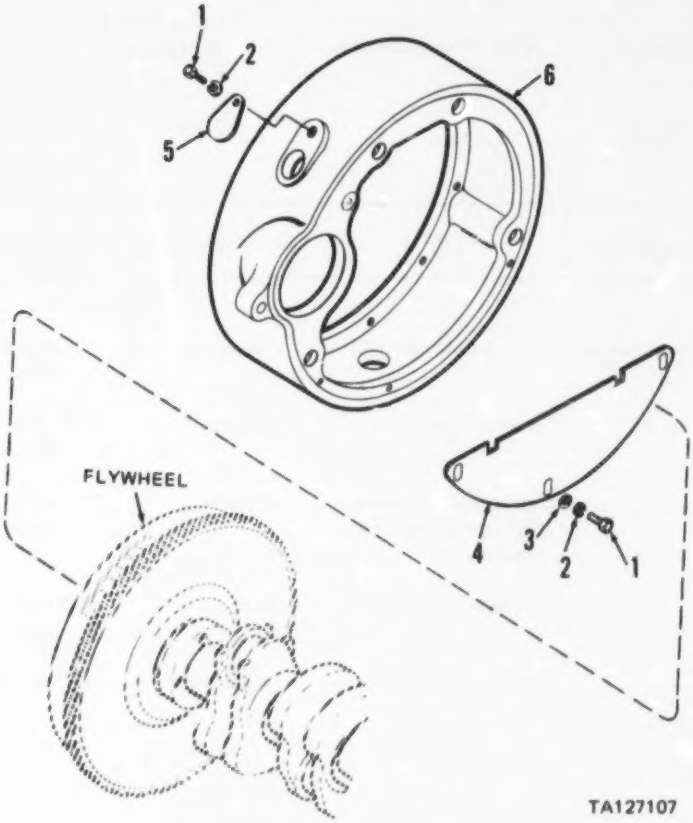
TOOLS		EQUIPMENT CONDITION	
		Paragraph	Condition Description
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641		Vehicle parked on level surface, engine off, and parking brake applied.
		2-53c	Side panels removed.

MATERIALS/PARTS
None

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Flywheel housing	Timing hole cover (5)	Relocate	Loosen screw (1) and relocate cover (5) away from timing hole
2		Covers (4 and 5)	Inspect	Notify general support maintenance if cover is missing or broken
3		Cap screws (1), lock washers (2) and flat washers (3)	Inspect	Notify general support maintenance if hardware is missing or damaged
4		Flywheel housing (6)	Inspect	Notify general support maintenance if cracked, distorted or otherwise damaged
5		Timing hole cover (5)	Relocate	Over timing hole. Secure with screw (1)

3-5. ENGINE MAINTENANCE (cont)

h. Flywheel Housing (cont).


1
2
6
5
FLYWHEEL
4
3
2
1
TA127107

KEY
1. Cap screws
2. Lock washers
3. Washers
4. Dust cover
5. Timing hole cover
6. Flywheel housing

3-5. ENGINE MAINTENANCE (cont)

i. Rocker Arm Cover.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Repair
- e. Installation

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Gasket
Hose, 44 ±0.5 inches long
(FSCM 24161 P/N
1FBRBRDLPBLKSYNRBRHYDHSE3-41D)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53d	Top hood removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, top	a. Clamp (1)	Loosen	
		b. Breather hose (2)	Disconnect	From elbow (8)
		d. Two nuts (3), washers (4) and grommets (5)	Remove	
		d. Rocker arm cover (6)	Lift and remove	From engine cylinder head
		e. Gasket (7)	Remove and discard	
2	Rocker arm cover (6)	Breather elbow (8)	Remove	From rocker arm cover (6)
CLEANING				

WARNING

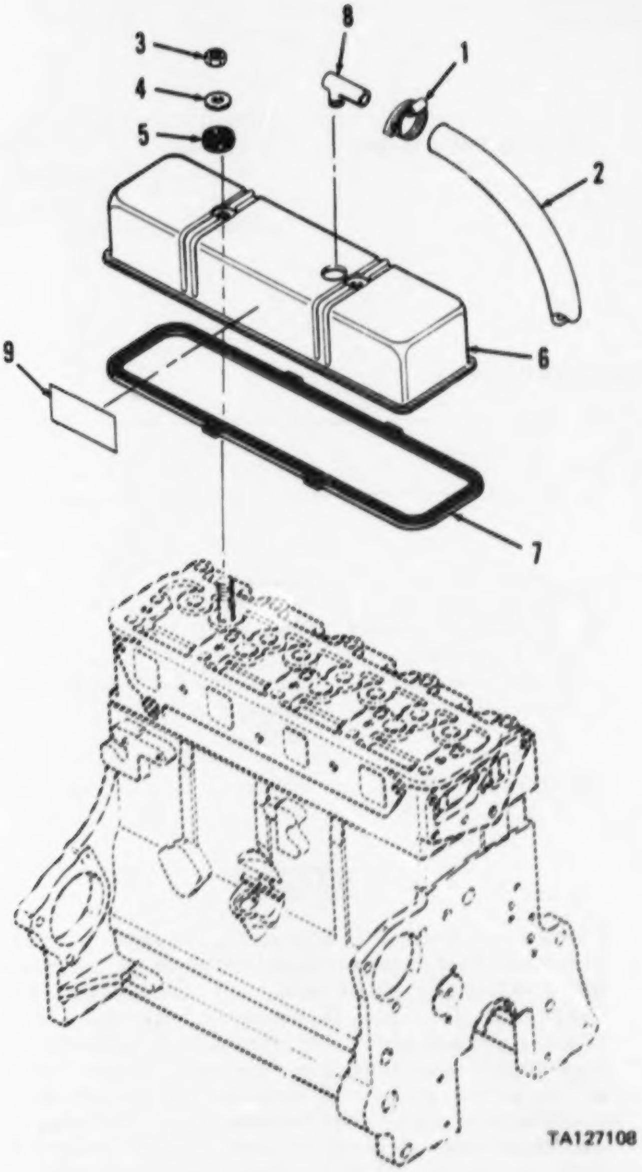
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

3-5. ENGINE MAINTENANCE (cont)

i. Rocker Arm Cover (cont).


8
3
1
4
5
2
6
9
7
TA127108

KEY
1. Clamp
2. Breather hose
3. Nuts
4. Washers
5. Grommets
6. Rocker arm cover
7. Gasket
8. Breather elbow
9. Decal

3-5. ENGINE MAINTENANCE (cont)

i. Rocker Arm Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3		Clamp (1), nuts (3), washers (4), rocker arm cover (6) and breather elbow (8)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
4		Rocker arm cover (6) and cylinder head	Clean	Scrape all gasket residue from mating surfaces
INSPECTION				
5		Rocker arm cover (6)	Inspect	Repair if dented. Replace if cracked or damaged so as to cause leakage
6		All other parts	Inspect	Replace if cracked, worn or threads damaged, if necessary, make hose (2) from FSCM 24161 P/N IFBRBRDLPBLKSYNRBRHYDHSE 3-41D; cut to 44±0.5 inches long
REPAIR				
7		Rocker arm cover (6)	Pound out small dents	Use a hammer and wooden backing block to remove dents from rocker arm cover. Be sure that gasket mating surface on rocker arm cover is not deformed
INSTALLATION				
8	Rocker arm cover	Breather elbow (8)	Install	
		NOTE If new rocker arm cover is used, install engine data decal (9) on new rocker arm cover (6).		
9	Engine compartment, top	a. New gasket (7)	Position	On engine cylinder head
		b. Rocker arm cover (6)	Position	On engine cylinder head
		c. Two grommets (5), washers (4) and nuts (3)	Install and tighten	Tighten to 4-6 pounds foot torque
		d. Clamp (1)	Position	Over breather hose (2)
		e. Breather hose (2)	Connect	To elbow (8)
		f. Clamp (1)	Position and tighten	Until breather hose (2) is securely fastened to elbow (8)
		g. Top hood	Install	Para 2-53d

3-5. ENGINE MAINTENANCE (cont)

j. Rocker Arm Assembly.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection/Repair
- e. Reassembly and Installation/Replacement
- f. Adjustment

INITIAL SETUP

TOOLS

No. 2 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0650
Micrometer, zero to 5 inches	
Bore gage, zero to 1 inch	
Spring tester	FSCM 45225 P/N CAS-10418

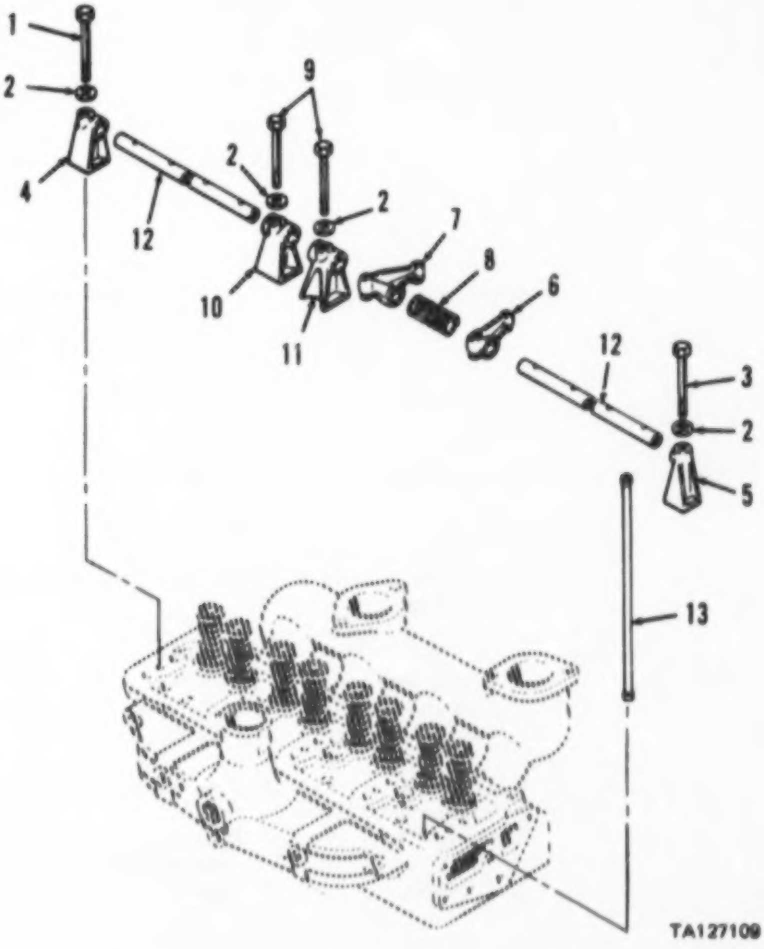
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
No. 30 engine oil

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
3-5i	Rocker arm cover removed.

KEY
1. Drilled bolt
2. Washers
3. Cap screws
4. Rear bracket
5. Front bracket
6. Right hand rocker arms
7. Left hand rocker arms
8. Springs
9. Cap screws
10. Center bracket
11. Intermediate brackets
12. Shafts
13. Push rods



3-5. ENGINE MAINTENANCE (cont)

j. Rocker Arm Assembly (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine cylinder head	a. Drilled bolt (1), cap screw (3) and two washers (2)	Loosen and remove	
		b. Rear bracket (4) and front bracket (5)	Remove	Support end rocker arm (6 and 7) and springs (8)
		c. Three cap screws (9) and washers (2)	Loosen	
		d. Rocker arms (6 and 7) and two springs (8)	Remove	Pull from front and rear end of shafts (12)
		e. Rocker arm assembly	Lift from cylinder head	Grasp ends of shafts (12), push together, and remove assembly from cylinder head
		g. Eight push rods (13)	Remove	Lift from cylinder head
DISASSEMBLY				
2	Rocker arm assembly	a. Two shafts (12)	Remove	Pull from center bracket (10)
		b. Rocker arms (6 and 7) and springs (8)	Remove	Pull from shafts (12)
		c. Intermediate brackets (11)	Remove	Pull from shafts (12)

CLEANING

CAUTION

Be careful not to scratch push rods or shafts in following step.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Shafts (12) and push rods (13)	Clean	Remove carbon and varnish deposits with a fine, power driven wire brush

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

3-5. ENGINE MAINTENANCE (cont)

j. Rocker Arm Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
		NOTE Flush rocker arm shafts (12) and drilled bolt (1) to remove residual material. Use compressed air to check oil holes for obstruction.		
INSPECTION/REPAIR				
5		Drilled bolt (1), washers (2) and cap screws (3)	Inspect	Replace if worn, or if threads damaged
6		Rocker arm shafts (12)	Inspect	Measure outside diameter with micrometer at worn spots on bottom of shaft. Replace shaft if outer diameter is less than 0.622 inch, or if shaft is corroded, pitted, cracked or scored
7		Springs (8)	Inspect	Install in spring tester. Check that force to compress spring to 1.75 inch is 7.5 to 8.5 pounds. Replace spring if required force is not 7.5 to 8.5 pounds
8		Rocker arms (6 and 7) and brackets (4, 5, 10 and 11)	Inspect	Use bore gage and check inside diameter. Measure bore gage with micrometer. Replace if inside diameter is greater than 0.626 inch, if pitted, scored or cracked, or if rocker arm adjusting screw threads damaged
9		Eight push rods (13)	Inspect	Replace if bent (place rod on flat surface and roll over surface; rod should roll smoothly indicating it is not bent), cracked, pitted or excessively worn

3-5. ENGINE MAINTENANCE (cont)

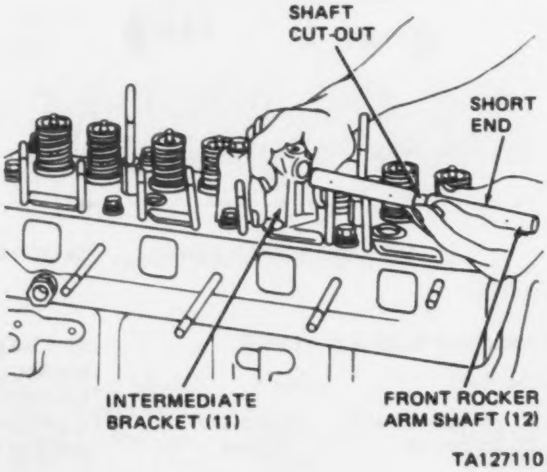
j. Rocker Arm Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY AND INSTALLATION/REPLACEMENT				
10	Engine cylinder head	a. All parts	Lubricate	Lightly coat with oil
		b. Eight push rods	Install	In cylinder head bores
		c. Center bracket (10)	Position	On cylinder head
		d. Washer (2) and cap screw (9)	Install and tighten	Hand-tighten only, to secure center bracket (10)

NOTE

Intermediate brackets (11) are installed on cylinder head with slanted side toward pushrods.

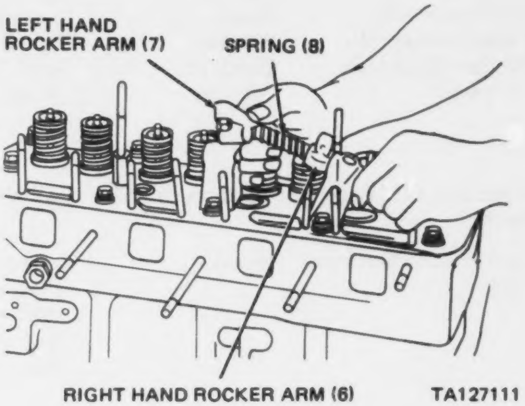
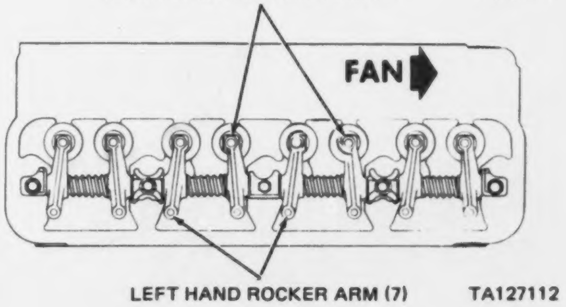
		e. Intermediate brackets (11)	Install	On shafts (12). Front shaft is installed with short end of shaft (as measured from shaft cut-out) toward fan end of engine. Rear shaft is installed with short end of shaft toward starter end of engine



		f. Spring (8) and rocker arms (6 and 7)	Install	Push on long end of shafts (12). Be sure slant of rocker arms is correct as shown

3-5. ENGINE MAINTENANCE (cont)

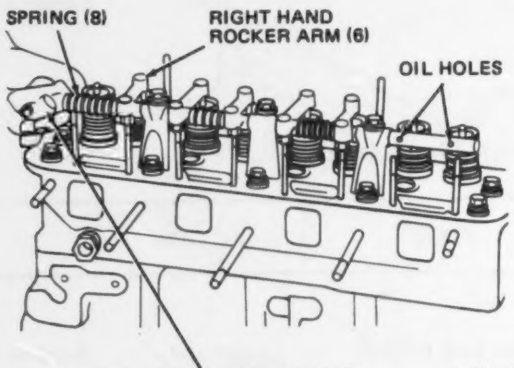
j. Rocker Arm Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY AND INSTALLATION/REPLACEMENT (cont)				
10 (cont)		 LEFT HAND ROCKER ARM (7) SPRING (8) RIGHT HAND ROCKER ARM (6) TA127111  FAN LEFT HAND ROCKER ARM (7) TA127112		
		g. Rocker arm shafts (12)	Install	Insert long end of shafts into center bracket (10); then position intermediate brackets (11) on cylinder head
		h. Two washers (2) and cap screws (9)	Install and tighten	Hand-tighten only, to secure intermediate brackets (11)
		NOTE Check that oil holes in shafts (12) are positioned horizontally as shown in the following step.		
		i. Spring (8) and rocker arms (6 and 7)	Install	Push on short end of shafts (12). Be sure slant of rocker arms is correct as shown

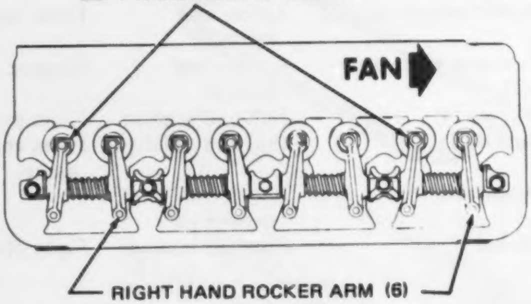
3-5. ENGINE MAINTENANCE (cont)

j. Rocker Arm Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY AND INSTALLATION/REPLACEMENT (cont)				
10 (cont)				


SPRING (8)
RIGHT HAND ROCKER ARM (6)
OIL HOLES
LEFT HAND ROCKER ARM (7)

TA127114


FAN
RIGHT HAND ROCKER ARM (6)

TA127113

STEP	LOCATION	ITEM	ACTION	REMARKS
		j. Rear bracket (4) and front bracket (5)	Position	Push shaft (12) against tension of spring (8)
		k. Washer (2) and cap screw (3)	Install and tighten	Hand-tighten only, to secure front bracket (5)
		l. Drilled bolt (1) and washer (2)	Install and tighten	Hand-tighten only, to secure rear bracket (4)
		m. Rocker arm bracket bolts (1, 3 and 9)	Tighten	Tighten to 25-30 pounds foot torque
ADJUSTMENT				
11		Valve tappet clearance	Adjust	Para 3-5a(2)

3-5. ENGINE MAINTENANCE (cont)

k. Oil Pan.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Repair
- e. Installation/Replacement

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5c	Engine removed from vehicle.

MATERIALS/PARTS

Cleaning solvent P-D-680	
Clean cloths	
Gasket	
Permatex 2	NSN 8030-00-873-4792

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine bottom	a. Four long bolts (1)	Loosen and remove	Support reinforcement strip (2)
		b. Reinforcement strip (2)	Lower and remove	From engine
		c. Fourteen short bolts (3)	Loosen and remove	Support oil pan (4)
		d. Oil pan (4)	Pull and remove	From engine
		e. Gasket (5)	Pull and remove	From engine or oil pan (4). Discard gasket (5)
		f. Drain plug (6)	Loosen and remove	
		g. Gasket (7)	Pull and remove	From plug (6)

CLEANING

WARNING

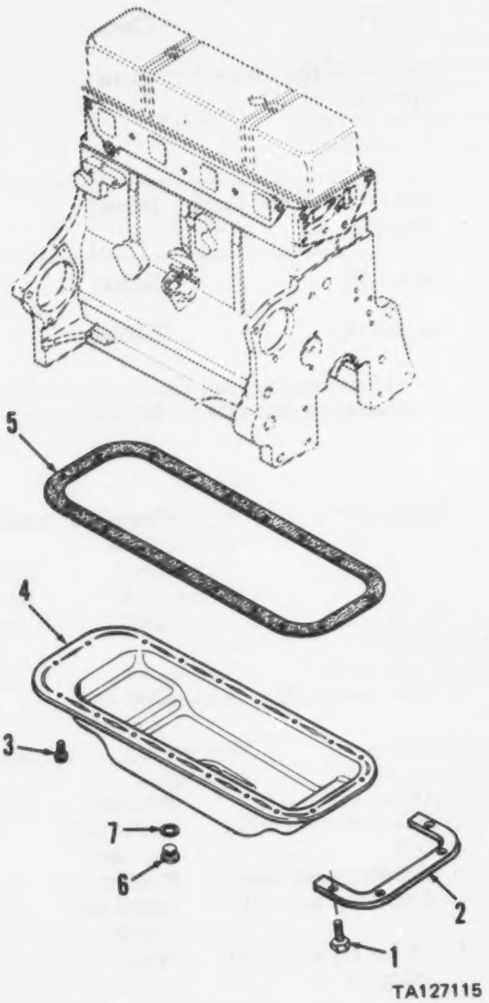
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

3-5. ENGINE MAINTENANCE (cont)

k. Oil Pan (cont).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TA127115

KEY
1. Long bolts
2. Reinforcement strip
3. Short bolts
4. Oil pan
5. Gasket
6. Drain plug
7. Gasket

3-5. ENGINE MAINTENANCE (cont)

k. Oil Pan (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
3		Oil pan (4) and engine crankcase	Clean	Scrape all gasket residue from mating surfaces
INSPECTION				
4		Bolts (1 and 3) and drain plug (6)	Inspect	Replace if worn, or if threads damaged
5		Gasket (7)	Inspect	Replace if worn, cracked or deteriorated
6		Oil pan (4)	Inspect	Repair if dented. Replace if cracked or damaged so as to cause leakage
7		Reinforcement strip (2)	Inspect	Replace if cracked, distorted or damaged
REPAIR				
8		Oil pan (4)	Pound out small dents	Use a hammer and wooden backing block to remove dents from oil pan. Be sure that gasket mating surface on oil pan is not deformed
INSTALLATION/REPLACEMENT				
9	Engine bottom	a. New gasket (5)	Coat and position	Apply Permatex 2 on both sides of gasket at front and rear portions only. Position gasket on mating surface of oil pan (4)
		b. Oil pan (4)	Position	On engine, with gasket holes in alignment
		c. Fourteen short bolts (3)	Install and tighten	Alternately tighten to 10-12 pounds foot torque
		d. Reinforcement strip (2)	Position	On oil pan (4)
		e. Four long bolts (1)	Install and tighten	Tighten to 15-20 pounds foot torque
		f. Gasket (7) and drain plug (6)	Install	Tighten drain plug to 29-31 pounds foot torque
10	Engine compartment	Engine	Install	Para 3-5c

3-6. FUEL SYSTEM MAINTENANCE

a. Fuel Injection Lines and Fittings.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation/Replacement

INITIAL SETUP

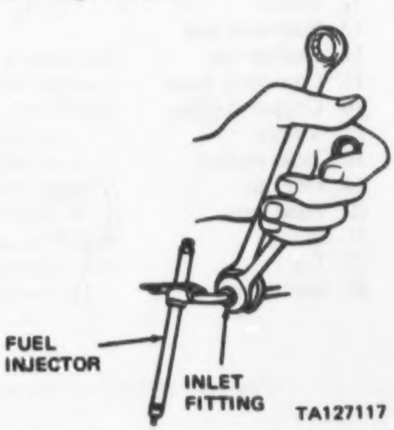
TOOLS
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Copper washers

EQUIPMENT CONDITION

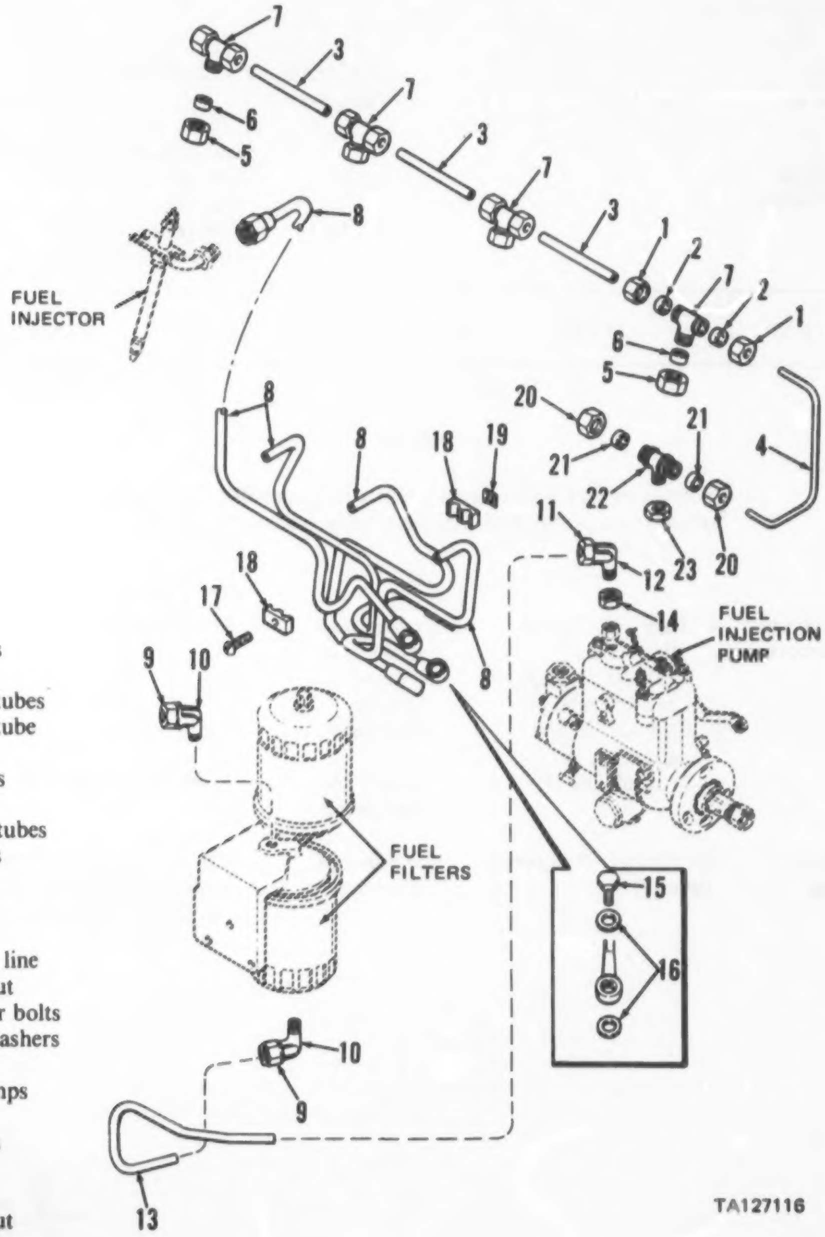
Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Side panels removed.
	Fuel tank shut-off valve closed.
2-15d(1)	Fuel return line disconnected from fuel injector tee fitting.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
		NOTE Thoroughly steam clean area around fuel injectors, fuel filters, fuel injection pump, and fuel lines before starting removal.		
1	Leak-off tube tees at fuel injectors	a. Tube nut (1) and sleeve (2)	Loosen and disconnect	From tee (7)
		b. Leak-off tube (3)	Remove	
		c. Leak-off tube (4)	Remove	
		d. Cap nut (5) and grommet (6)	Disconnect	From tee (7)
		e. Leak-off tee (7)	Loosen and disconnect	From tee (7) and fuel injector
2	Fuel injector inlet fittings	Inlet fitting on injection tube (8)	Loosen and disconnect	Use one hand, two wrench method as shown to minimize possibility of damage to fitting or injector



3-6. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injection Lines and Fittings (cont).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FUEL INJECTOR
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21
4
22
20
11
12
23
18
17
14
FUEL INJECTION PUMP
9
10
8
15
FUEL FILTERS
16
10
9
13

KEY

1. Tube nuts
2. Sleeves
3. Leak-off tubes
4. Leak-off tube
5. Cap nuts
6. Grommets
7. Tees
8. Injection tubes
9. Tube nuts
10. Elbows
11. Tube nut
12. Elbow
13. Fuel inlet line
14. Sealing nut
15. Connector bolts
16. Copper washers
17. Screws
18. Tube clamps
19. Flat nut
20. Tube nuts
21. Sleeves
22. Tee
23. Sealing nut

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3-6. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injection Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3	Fuel filters	a. Tube nut (9)	Loosen and disconnect	
		b. Elbow (10)	Loosen and remove	From filter head
4	Fuel injection pump	a. Tube nut (11)	Loosen and disconnect	
		b. Elbow (12) and sealing nut (14)	Loosen and remove	From injection pump
		c. Fuel inlet line (13)	Remove	
		d. Four connector bolts (15)	Loosen and remove	
		e. Copper washers (16)	Remove and discard	
		f. Screws (17) and tube clamps (18)	Remove	

NOTE

Remove flat nut (19) from clamp (18) only if necessary for replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Injection tube (8)	Remove	From engine and injection pump
		h. Tube nut (20) and sleeve (21)	Loosen and disconnect	From tee (22)
		i. Leak-off tube (4)	Remove	
		j. Tee (22) and sealing nut (23)	Loosen and remove	From injection pump
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		All parts	Clean	Use cleaning solvent P-D-680

3-6. FUEL SYSTEM MAINTENANCE (cont)

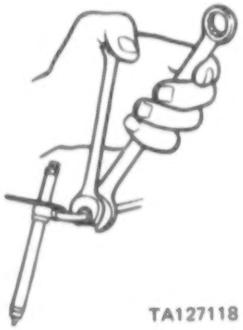
a. Fuel Injection Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
6		All tubes, lines and fittings	Flush	Flush with clean diesel fuel to remove all traces of cleaning solvent. Dry thoroughly with compressed air
INSPECTION				
7		Tube assemblies (3, 4, 8 and 13)	Inspect	Replace if cracked, kinked, dented, split, or if inlet fittings damaged
8		All other parts	Inspect	Replace if cracked, damaged, or threads worn
INSTALLATION/REPLACEMENT				
9	Fuel injection pump	a. Sealing nut (23) and tee (22)	Install and tighten	Tighten sealing nut (23) to 20 pounds foot torque
		b. Leak-off tube (4)	Position	On tee (22)
		c. Sleeve (21) and tube nut (20)	Install and tighten	
		d. Injection tube (8)	Position	On injection pump and fuel injector
10	Fuel injector	Inlet fitting on injection tube (8)	Connect and tighten	Tighten hand-tight only
11	Fuel injection pump			
		CAUTION Do not tighten connector bolts (15) unless copper washers (16) are in place. If copper washers are not used, pump seizure could result due to connector bolt going too deep into pump body.		
		a. Connector bolt (15) and two new copper washers (16)	Install and tighten	Tighten to 35 pounds foot torque
		b. Sealing nut (14) and elbow (12)	Install and tighten	Tighten sealing nut (14) to 20 pounds foot torque
		c. Tube clamps (18), nuts (19) and screws (17)	Install	To secure tubes (8)
		d. Fuel inlet line (13)	Position	On fuel filter and injection pump
		e. Tube nut (11)	Install and tighten	To secure line (13)

3-6. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injection Lines and Fittings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
12	Fuel filters	a. Elbow (10)	Install and tighten	
		b. Tube nut (9)	Connect and tighten	To secure line (13)
13	Fuel injector	a. Cap nut (5), grommet (6) and tee (7)	Connect and tighten	To fuel injector
		b. Leak-off tubes (3 and 4)	Position	On tees (7)
		c. Sleeve (2) and tube nut (1)	Connect and tighten	To secure tubes (3 and 4)
LEAK TEST				
14		a. Fuel tank shut-off valve	Open	
		b. Engine	Crank with starter	Until fuel flows from inlet fitting on injection tube (8)
		c. Inlet fitting on injection tube	Tighten	Use one hand, two wrench method as shown
		d. Engine	Start and check for leaks	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3-6. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injector.

This task covers fuel injector replacement consisting of removal, cleaning, and installation.

INITIAL SETUP

TOOLS

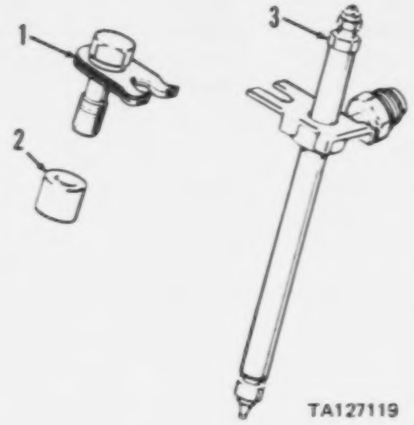
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Nozzle Puller	FSCM 10988 P/N A43278
Bore Cleaner	FSCM 10988 P/N A43277

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Side panels removed.
3-6a	Fuel injector leak-off and injection tubes disconnected.



KEY
1. Clamp assembly
2. Spacer
3. Fuel injector

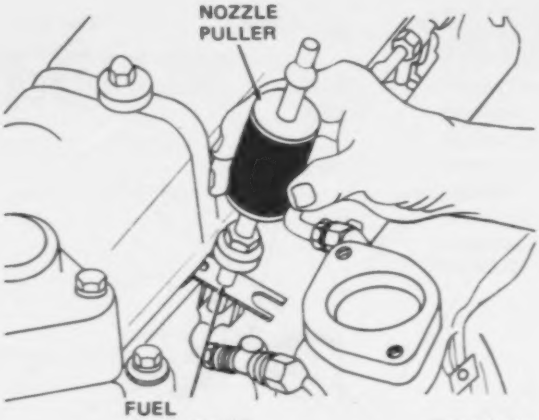
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Fuel injector at cylinder head	a. Clamp assembly (1) and spacer (2)	Loosen and remove	
		CAUTION Do not attempt to remove fuel injector (3) by prying with screwdriver or similar tool. Prying with screwdriver will distort and damage fuel injector.		
		b. Fuel injector (3)	Pull upward, turn and remove	From engine. If injector cannot be easily removed by hand, use nozzle puller tool as shown

3-6. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)



CLEANING

WARNING

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2		Cylinder head fuel injector seal surfaces	Clean	Use cleaning solvent P-D-680 and dry thoroughly. Remove all dirt and burrs which could cause distortion of fuel injector when clamping in place

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

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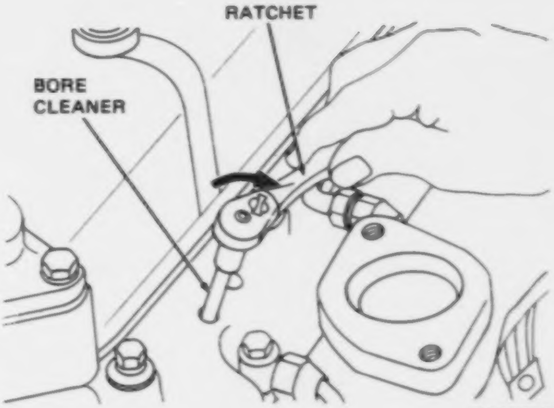
3-6. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injector (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
3		Cylinder head fuel injector bore	Clean	Use bore cleaning tool as shown. Gradually turn tool into bore using clockwise rotation; then remove tool and blow out bore with compressed air



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STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION				
4	Cylinder head, fuel injector bore	a. Fuel injector (3)	Install	Into bore, using a twisting motion
		b. Spacer (2) and clamp assembly (1)	Position	On fuel injector lock plate
		c. Clamp assembly (1)	Tighten	Tighten bolt to 18-22 pounds foot torque
5	Fuel injector	Leak-off and injection tubes	Connect and tighten	Para 3-6a

3-6. FUEL SYSTEM MAINTENANCE (cont)

c. Fuel Injection Pump.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

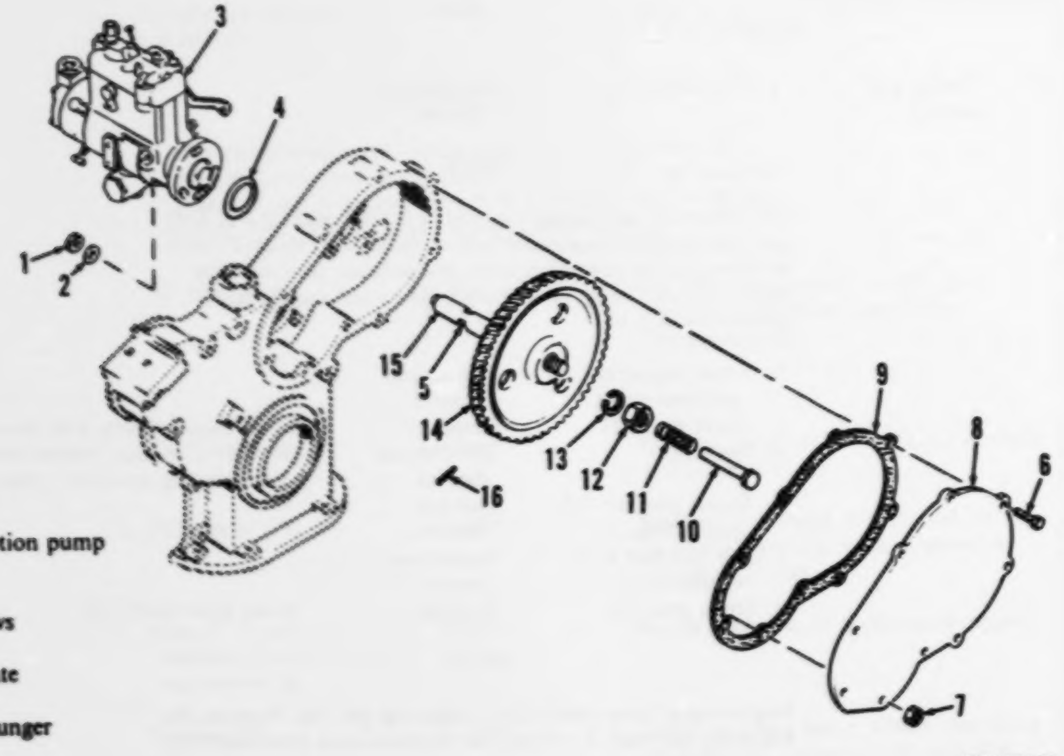
TOOLS

Automotive Mechanic's	NSN 5180-00-754-0641
Spring Tester	FSCM 42225 P/N CAS-10418
Tool Kit	
Dial Indicator	
Sleeve Tool	FSCM 10988 P/N CD322
Seal Compression Tool	FSCM 10988 P/N CD331

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Pump drive shaft seals
Injection pump O-ring
Pump window cover gasket
Gear housing cover plate gasket
Lubriplate

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and parking brake applied.
2-53c	Side panels removed.
	Fuel tank shut-off valve closed.
2-15f	Fuel filters and filter head removed.
3-6a	Injection pump fuel lines and fittings disconnected.
3-5a(1)	Engine positioned at TDC for No. 1 cylinder.
2-15i	Accelerator ball joint and cable disconnected from fuel injection pump.



KEY
1. Nuts
2. Washers
3. Fuel injection pump
4. O-ring
5. Seals
6. Cap screws
7. Nuts
8. Cover plate
9. Gasket
10. Thrust plunger
11. Spring
12. Nut
13. Lock washer
14. Drive gear
15. Drive shaft
16. Roll pin

3-6. FUEL SYSTEM MAINTENANCE (cont)

c. Fuel Injection Pump (cont).

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">REMOVAL</td></tr>
<tr><td>1</td><td>Fuel injection pump (3)</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">NOTE
If the same injection pump is to be reinstalled, scribe small match marks on injection pump flange and timing gear housing to aid in installation.</td></tr>
<tr><td></td><td></td><td>a. Three nuts (1) and washers (2)</td><td>Loosen and remove</td><td>Support pump (3)</td></tr>
<tr><td></td><td></td><td>b. Injection pump (3)</td><td>Remove</td><td>Carefully pull off of drive shaft (15)</td></tr>
<tr><td></td><td></td><td>c. O-ring (4)</td><td>Remove and discard</td><td></td></tr>
<tr><td>2</td><td>Timing gear housing</td><td>a. Two seals (5)</td><td>Remove and discard</td><td></td></tr>
<tr><td></td><td></td><td colspan="3">NOTE
The following steps cover removal of drive shaft (15) and drive gear (14). If injection pump is to be replaced, drive shaft (15) must be forwarded to general support maintenance with defective pump. If only O-ring (4) and seals (5) require replacement, proceed to step 14.</td></tr>
<tr><td></td><td></td><td>b. Seven cap screws (6) and two nuts (7)</td><td>Loosen and remove</td><td></td></tr>
<tr><td></td><td></td><td>c. Cover plate (8)</td><td>Remove</td><td>From engine timing gear housing</td></tr>
<tr><td></td><td></td><td>d. Gasket (9)</td><td>Remove and discard</td><td>Remove all gasket residue from timing gear housing and cover plate (8)</td></tr>
<tr><td></td><td></td><td>e. Thrust plunger (10) and spring (11)</td><td>Pull and remove</td><td></td></tr>
<tr><td></td><td></td><td>f. Nut (12) and lock washer (13)</td><td>Loosen and remove</td><td></td></tr>
<tr><td></td><td></td><td>g. Drive gear (14)</td><td>Remove</td><td>From drive shaft (15)</td></tr>
<tr><td></td><td></td><td colspan="3">NOTE
Replacement drive shaft (15) includes roll pin (16). Perform the following step only if roll pin (16) is sheared and drive shaft (15) is not damaged.</td></tr>
<tr><td></td><td></td><td>h. Roll pin (16)</td><td>Remove</td><td>From drive shaft (15). Use 3/32 inch drift or carbide tipped drill bit</td></tr>
</table>

3-6. FUEL SYSTEM MAINTENANCE (cont)

c. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
3		Exterior of injection pump (3)	Clean	Wipe using cloth moistened with cleaning solvent P-D-680
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
5		Drive shaft (15)	Inspect	Replace if bent, pitted, distorted or excessively worn
6		Drive gear (14)	Inspect	Replace if damaged or distorted, or if gear teeth missing, broken, pitted or excessively worn
7		Nuts (1, 7, and 12), washers (2 and 13) and cap screws (6)	Inspect	Replace if worn, or if threads damaged
8		Spring (11)	Inspect	Install in spring tester. Check that force to compress spring to 0.95 inch is 6 pounds, 4 ounces, and that free length is 1.22 inches. Replace spring if above specifications are not met, or if coils distorted or broken

3-6. FUEL SYSTEM MAINTENANCE (cont)

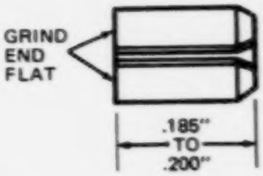
c. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
9		Thrust plunger (10)	Inspect	Replace if cracked, bent or excessively worn
10		Cover plate (8)	Inspect	Replace if cracked, distorted, or damaged
11		Injection pump flange and mating surface on timing gear housing	Inspect	Use fine stone or crocus cloth to remove any nicks or burrs from mating surfaces
INSTALLATION				
12	Drive shaft (15)			

NOTE

Replacement drive shaft (15) includes roll pin (16). Perform steps a and b below only if roll pin (16) requires replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		a. Roll pin (16)	Fabricate	Use 10988 P/N 138-275 roll pin and grind flat on one end to the overall length shown



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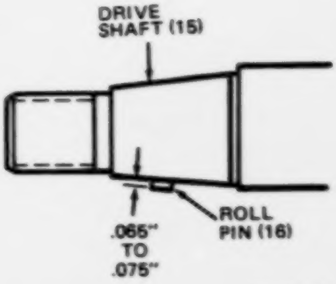
STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Roll pin (16)	Install	Press into drive shaft (15), chamfered end first, to the dimension shown below



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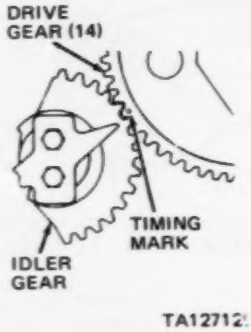
3-6. FUEL SYSTEM MAINTENANCE (cont)

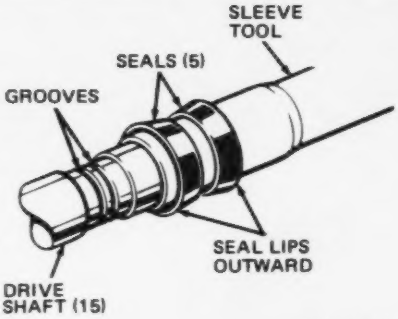
c. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
13	Timing gear housing	a. Drive shaft (15)	Install	On large hub side of drive gear (14)
		b. Drive gear (14) and shaft (15)	Position	In timing gear housing. Align timing mark mark on drive gear (14) with timing pointer on idler gear as shown below
				
		c. Lock washer (13) and nut (12)	Install and tighten	Tighten nut (12) to 40-50 pounds foot torque
		d. Drive gear (14)	Check backlash	Using dial indicator on one tooth of drive gear (14), measure drive gear-to-idler gear backlash. If backlash exceeds 0.007 inch, install new drive gear (14) and recheck. If backlash still exceeds 0.007 inch, replace idler gear (notify general support maintenance)
		e. Spring (11) and thrust plunger (10)	Install	In bore of drive shaft (15). Make sure plunger (10) is free to move in bore of drive shaft
		f. Cover plate (8) and new gasket (9)	Position	On timing gear housing
		g. Seven cap screws (6) and two nuts (7)	Install and tighten	Tighten to 25-30 pounds foot torque
14	Drive shaft (15)	Two new seals (5)	Install	Generously lubricate seals with lubriplate. Install seals on sleeve tool with lips of seals outward (seals back-to-back as shown below); then slide sleeve tool over drive shaft (15) and position seals in grooves of drive shaft

3-6. FUEL SYSTEM MAINTENANCE (cont)

c. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
14 (cont)				


SLEEVE TOOL
SEALS (5)
GROOVES
SEAL LIPS OUTWARD
DRIVE SHAFT (15)

TA127126

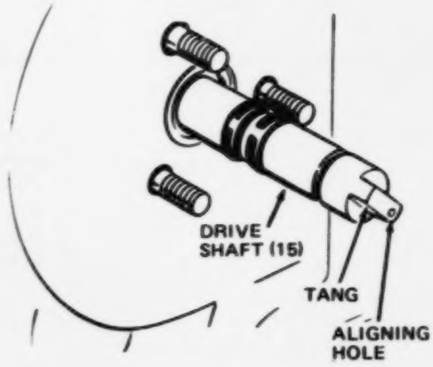
NOTE

If engine has been cranked after removing fuel injection pump, reposition engine at TDC for No. 1 cylinder (para 3-5a(1)).

15	Fuel injection pump (3) and drive shaft (15)	a. New O-ring (4)	Position	On injection pump flange
		b. Two timing window screws, cover and gasket	Remove	
		c. Pump rotor	Position	Using a clean, wide bladed screwdriver at drive end of injection pump, rotate pump rotor to approximate position of aligning hole of tang on drive shaft (15) as shown below. Then rotate pump rotor until timing lines in pump window are aligned

NOTE

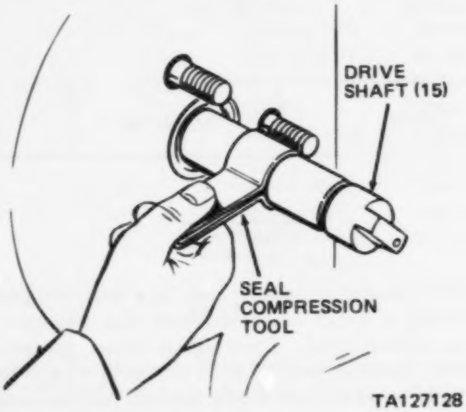
If holes on drive shaft tang and pump rotor are not aligned, pump will be 180 degrees out of time.


DRIVE SHAFT (15)
TANG
ALIGNING HOLE

TA127127

3-6. FUEL SYSTEM MAINTENANCE (cont)

c. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
15 (cont)		d. Two seals (5)	Compress	Use seal compression tool as shown below
				
		e. Fuel injection pump (3)	Install	While still compressing seals (5) with compression tool, slide injection pump onto drive shaft (15) and over seals (5); then remove compression tool and slide pump against timing gear housing. After compression tool is removed, it may be necessary to rotate pump body slightly to permit tang of drive shaft (15) to engage slot in injection pump
		NOTE If rear seal (5) is rolled over on drive shaft (15) during installation, remove injection pump (3) and replace rear seal (5) even though no visual damage is apparent.		
		f. Three washers (2) and nuts (1)	Install and tighten	Tighten hand-tight only
		g. Injection pump fuel lines and fittings	Reconnect	Para 3-6a
		h. Fuel injection pump (3)	Check and adjust timing, engine idle speed, and no-load governed speed	Para 3-5a(3)

3-7. RADIATOR AND SHROUD MAINTENANCE

This task covers:
a. Cleaning
b. Inspection
c. Repair

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

MATERIALS/PARTS

Cleaning compound	NSN 6850-00-598-7328
Cleaning solvent P-D-680	
Clean cloths	

EQUIPMENT CONDITION

Paragraph	Condition Description
2-17c	Radiator and shroud removed.

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">CLEANING</td></tr>
<tr><td colspan="5">WARNING
Use alkaline cleaning compound only in a well ventilated area. Avoid inhaling of fumes or contact with skin. Failure to do so could cause serious injury. If you inhale fumes, get fresh air immediately. If contact with skin or clothes is made, flush with large amounts of water and obtain medical aid immediately.</td></tr>
<tr><td>1</td><td></td><td>Radiator</td><td>Clean</td><td>Use alkaline immersion process with cleaning compound. After cleaning, thoroughly rinse with water to remove all traces of cleaning compound</td></tr>
<tr><td colspan="5">WARNING
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.</td></tr>
<tr><td colspan="5">NOTE
Radiator exterior and cooling fins may also be cleaned using cleaning solvent P-D-680. Dry thoroughly, and rinse with clear water to remove all traces of cleaning solvent.</td></tr>
</table>

3-7. RADIATOR AND SHROUD MAINTENANCE (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR				
2		Radiator shroud	Inspect	Repair broken welds and cracks by welding. Replace shroud if beyond economical repair
3		Radiator	a. Inspect cooling fins and core	Straighten bent fins, using care not to damage core. Repair leaking core tubes by soldering, using minimum amount of solder to prevent clogging tubes
			b. Inspect interior and core	Repeat cleaning (step 1) as necessary to remove all scale deposits
			c. Inspect tanks, filler neck, brackets and hose flanges	Repair cracked or leaking areas by soldering, using minimum amount of solder to prevent clogging radiator

NOTE

After soldering radiator, perform radiator pressure test (para 2-12, MALFUNCTION 3) to check for leakage. Replace radiator if excessively clogged with scale deposits, or if unable to repair by soldering.

STEP	LOCATION	ITEM	ACTION	REMARKS
			d. Paint	As soon as possible after pressure test, paint repaired areas using dull black radiator paint

Section II. ELECTRICAL SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the:
- Engine starter and solenoid
- Alternator
- Wiring Harnesses

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of direct support maintenance.

	Para
Troubleshooting Symptom Index	3-8
Alternator Troubleshooting	3-9
Starter and Solenoid Troubleshooting	3-10
Wiring Harness Troubleshooting	3-11
Alternator Repair	3-12
Starter and Solenoid Repair	3-13
Instrument Panel Replacement	3-14
Wiring Harness Replacement	3-15
Front Wiring Harness	3-15a
Rear Wiring Harness	3-15b

3-8. TROUBLESHOOTING SYMPTOM INDEX

NOTE

An electrical system wiring diagram is located at the back of this manual in appendix F.

	Para/Malfunction	Page
ALTERNATOR TROUBLESHOOTING		
Improper output voltage	3-9/1	3-89
Improper output current	3-9/2	3-90
STARTER AND SOLENOID TROUBLESHOOTING		
Starter troubleshooting	3-10/1	3-90
Starter fails to crank	3-10/2	3-91
WIRING HARNESS TROUBLESHOOTING		
Major portion of electrical system inoperative	3-11/1	3-92
One electrical circuit inoperative	3-11/2	3-92

3-9. ALTERNATOR TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

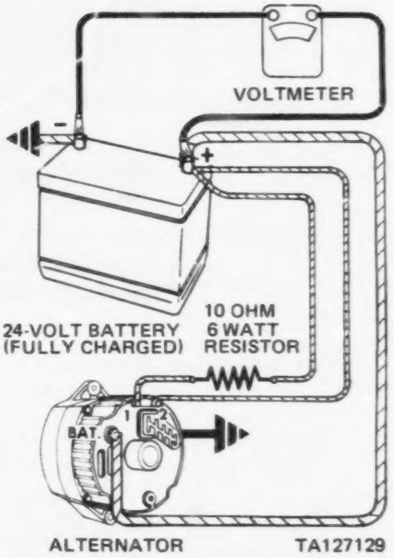
1. IMPROPER OUTPUT VOLTAGE

Step 1. Connect test set-up to alternator as illustrated. Slowly increase alternator speed and observe voltmeter reading.

a. If voltmeter reading is uncontrolled with speed, and increases above 31 Vdc, check alternator field winding and regulator (para 3-12).

b. If voltmeter indicates battery voltage (no increase in voltage), proceed to step 2.

c. If voltmeter reading increases (greater than battery voltage and less than 31 Vdc), proceed to MALFUNCTION 2 (IMPROPER OUTPUT CURRENT).


VOLTMETER
-
+
24-VOLT BATTERY (FULLY CHARGED)
10 OHM 6 WATT RESISTOR
BAT.
1
2
ALTERNATOR

TA127129

Step 2.

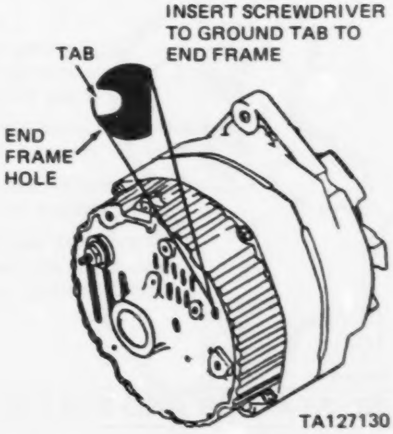
CAUTION

Tab is within 3/4 inch of casting surface. Do not force screwdriver deeper than one inch into alternator end frame.

Insert screwdriver into test hole in end frame and ground tab as shown; then repeat step 1.

a. If voltmeter indicates battery voltage (no increase in voltage), check rotor, stator, diode trio, rectifier bridge, and regulator mounting screws (para 3-12).

b. If voltmeter reading increases, replace the regulator (para 3-12).


INSERT SCREWDRIVER TO GROUND TAB TO END FRAME
TAB
END FRAME HOLE

TA127130

3-9. ALTERNATOR TROUBLESHOOTING (cont)

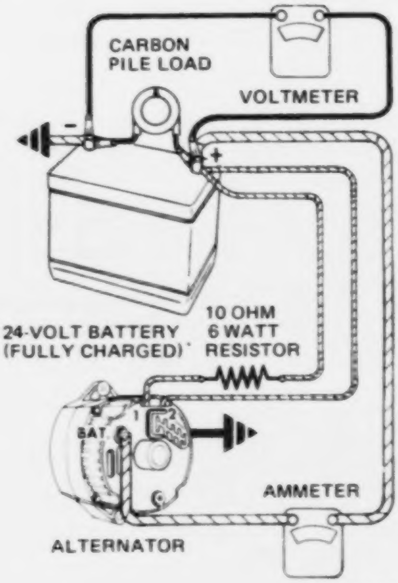
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. IMPROPER OUTPUT CURRENT

Step 1. Connect test set-up to alternator as illustrated. Operate alternator at moderate speed and adjust carbon pile for maximum indication on ammeter. Note ammeter indication.

a. If ammeter indicates 27 to 47 amperes, and voltmeter indicates less than 31 Vdc, alternator operation is normal.

b. If ammeter does not indicate 27 to 47 amperes, proceed to step 2.


CARBON PILE LOAD
VOLTMETER
-
+
24-VOLT BATTERY (FULLY CHARGED)
10 OHM 6 WATT RESISTOR
BAT
1
2
AMMETER
ALTERNATOR

TA127131

Step 2.

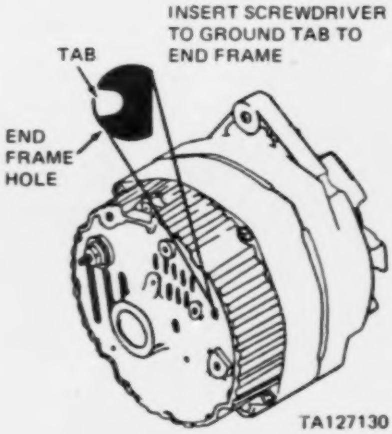
CAUTION

Tab is within 3/4 inch of casting surface. Do not force screwdriver deeper than one inch into alternator end frame.

Insert screwdriver into test hole in end frame and ground tab as shown; then repeat step 1.

a. If ammeter indicates 27 to 47 amperes, check field winding and regulator (para 3-12).

b. If ammeter does not indicate 27 to 47 amperes, check the alternator field winding, diode trio, rectifier bridge and stator (para 3-12).


INSERT SCREWDRIVER TO GROUND TAB TO END FRAME
TAB
END FRAME HOLE

TA127130

3-10. STARTER AND SOLENOID TROUBLESHOOTING

1. STARTER TROUBLESHOOTING

NOTE

Compare results of starter no-load test (STARTER CRANKS TOO SLOWLY, para 2-21) with the following chart and then refer to paragraph 3-13:

3-10. STARTER AND SOLENOID TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Armature Speed	Current Draw	Probable Cause	Inspection Data
Zero	Zero	Open field circuit.	Check internal connections and field coils for open condition.
		Open armature coils.	Inspect commutator for badly burned bars after disassembly.
		Poor brush contact.	Check for broken brush springs, worn brushes, and high insulation between commutator bars.
Zero	High	Grounded terminals or fields.	Disconnect field coil ground connections and check for grounded condition.
		Frozen bearings.	Rotate armature by prying pinion with a screwdriver.
Low	Low	High internal resistance.	Check for poor connections, defective leads, and dirty commutator.
Low	High	Excessive friction.	Check for tight, dirty, or worn bearings, bent armature shaft or loose pole shoes allowing armature to drag.
		Shorted armature.	Check armature in a growler after disassembly.
		Grounded field coils or armature.	Disconnect field coil ground connections and check for grounded condition.
High	High	Shorted field coils.	Replace field coils and repeat bench test.

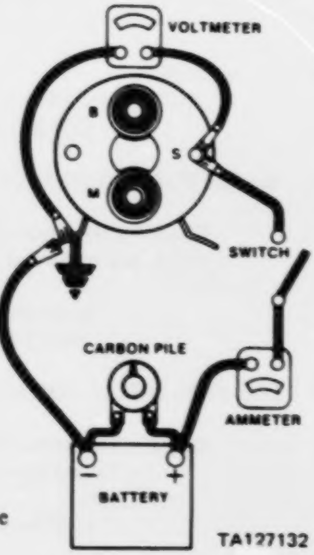
2. STARTER FAILS TO CRANK

Step 1. Disconnect and tape field coil lead at solenoid M terminal. Connect solenoid terminals to test set-up as shown. Close switch, adjust carbon pile for 9 Vdc indication on voltmeter, and note ammeter reading.

a. If ammeter indicates 6.5 to 7.0 amperes, proceed to step 2.

b. If ammeter does not indicate 6.5 to 7.0 amperes, replace solenoid switch (para 3-13).

Step 2. Reconnect solenoid terminals to pull-in winding test set-up as shown on following page.



CAUTION

To prevent overheating solenoid, do not close switch for more than 15 seconds at a time.

Close the switch and adjust carbon pile for 20 Vdc indication on voltmeter. Note ammeter reading and open switch.

3-10. STARTER AND SOLENOID TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

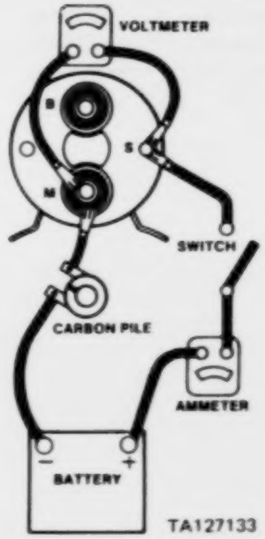
2. STARTER FAILS TO CRANK (cont)

Step 2. (cont)

a. If ammeter indicates 6.5 to 7.0 amperes, remove solenoid (para 3-13) and check for binding plunger or defective spring.

b. If ammeter indicates more than 7.0 amperes, winding is shorted or grounded. Replace solenoid (para 3-13).

c. If ammeter indicates less than 6.5 amperes, winding has excessive resistance. Clean solenoid terminals and repeat pull-in winding test. If ammeter still indicates less than 6.5 amperes, replace solenoid (para 3-13).



3-11. WIRING HARNESS TROUBLESHOOTING

NOTE

Refer to electrical system wiring schematic (appendix F), front wiring harness illustration (para 3-15a), and rear wiring harness illustration (para 3-15b).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. MAJOR PORTION OF ELECTRICAL SYSTEM INOPERATIVE

Check for improper connection or defective connectors between front and rear wiring harnesses, **IGNITION** switch and connector, and **VEHICLE LIGHTS** switch and connector.

If connections are correct, replace front wiring harness (para 3-15a) or rear wiring harness (para 3-15b).

2. ONE ELECTRICAL CIRCUIT INOPERATIVE

Step 1. Disconnect harness lead(s) from affected component, and use an ohmmeter to check for open circuit caused by breaks in wiring or faulty connectors.

a. If harness wire is broken, and wire is not accessible, replace wiring harness (para 3-15).

b. If harness wire is not broken, proceed to step 2.

3-11. WIRING HARNESS TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. ONE ELECTRICAL CIRCUIT INOPERATIVE (cont)

Step 2. Use an ohmmeter to check for short circuit caused by damaged insulation, screw driven through the wire, or wires from different circuits making contact.

a. If harness wire is shorted or grounded, and not accessible for repair, replace wiring harness (para 3-15).

b. If harness wire is not shorted, test electrical component in affected circuit (refer to organizational maintenance).

3-12. ALTERNATOR REPAIR

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Testing
e. Reassembly

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Valve guide installer	FSCM 72582 P/N J5158-2
Front cover seal installer	FSCM 72582 P/N J7584-1
Camshaft gear remover	FSCM 72582 P/N J8810

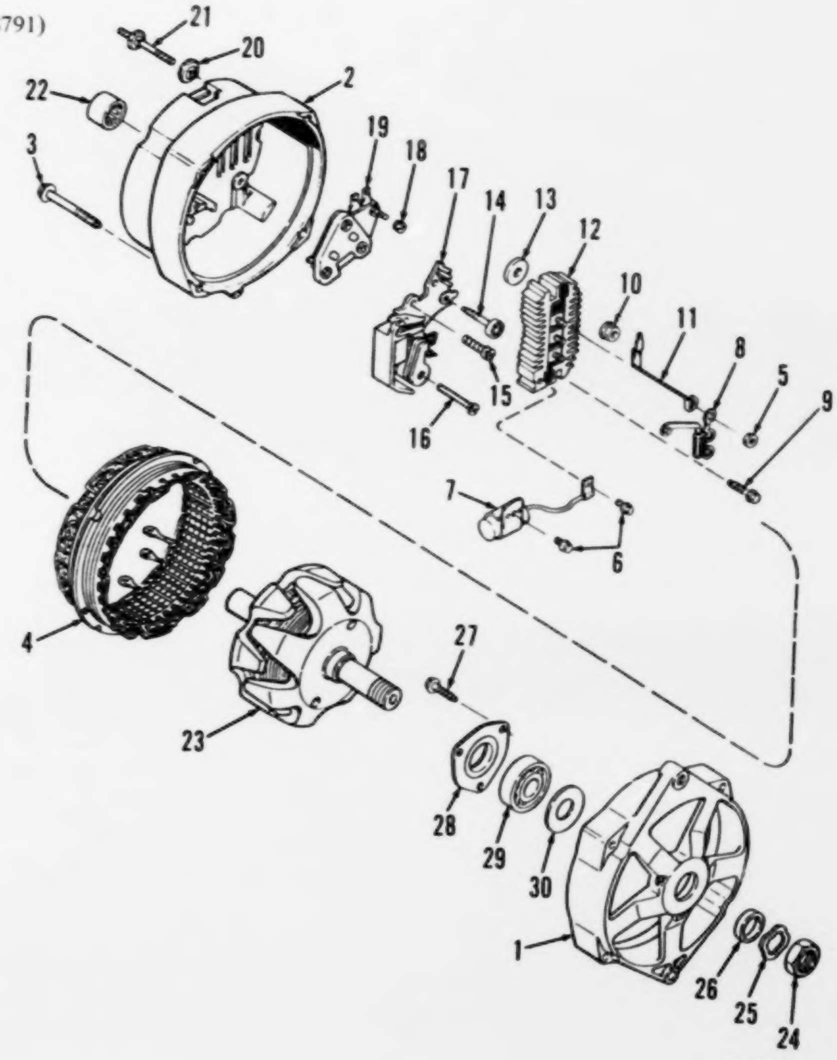
EQUIPMENT CONDITION

Paragraph	Condition Description
2-26	Alternator removed from vehicle.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Lubricant (FSCM 16764 P/N 1948791)
Lock washer

KEY

1. Drive end frame
2. Slip ring end frame
3. Thru bolts
4. Stator
5. Nuts
6. Screws
7. Capacitor
8. Diode trio
9. Screws
10. Nut
11. Relay terminal
12. Rectifier bridge assembly
13. Insulator, terminal stud
14. Screws
15. Screw
16. Screw
17. Brush holder
18. Nut
19. Voltage regulator
20. Outer terminal stud
21. Stud terminal
22. Roller bearing
23. Rotor
24. Shaft nut
25. Lock washer
26. Shaft collar
27. Screws
28. Ball bearing retainer plate
29. Ball bearing
30. Grease slinger washer



3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Alternator assembly (31)	a. Drive end frame (1) and slip ring end frame (2)	Match mark	Scribe positioning marks on frames for correct reassembly
		b. Four thru bolts (3)	Loosen and remove	

CAUTION

Use extreme care not to touch stator winding when inserting screwdriver blades and prying frames apart. Do not use hammer to drive frames apart.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Drive end frame (1) and stator and slip ring end frame (2)	Separate	Insert two screwdriver blades in slip ring end

NOTE

When separating, work evenly around circumference of frame.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Drive end frame (1)	Remove	
2	Slip ring end frame (2)	a. Three nuts (5)	Remove	

CAUTION

Use care when removing to avoid damaging stator.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Stator (4)	Disconnect and remove	Tag stator leads for reassembly
		c. Two screws (6)	Remove	
		d. Capacitor (7)	Remove	
		e. Diode trio (8)	Remove	
		f. Two screws (9)	Remove	
		g. Nut (10)	Remove	
		h. Relay terminal (11)	Remove	
		i. Rectifier bridge assembly (12)	Remove	
		j. Terminal stud insulator (13)	Remove	
		k. Two screws (14)	Remove	
		l. Screw (15)	Remove	
		m. Screw (16)	Remove	
		n. Brush holder (17)	Remove	
		o. Nut (18)	Remove	
		p. Voltage regulator (19)	Remove	

3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
2 (cont)		q. Outer terminal stud insulator (20)	Remove	
		r. Stud terminal (21)	Remove	
		s. Slip ring end frame (2)	Position	On open jaws of vise, so jaws support area around bearings
		NOTE Remove bearing (22) if worn, cracked, pitted or damaged, or if grease supply is exhausted.		
		t. Bearing (22)	Remove and discard	Use valve guide installer tool and press out of end frame (2)
3	Drive end frame (1)			
		CAUTION Do not overtighten vise. Overtightening may distort and damage rotor.		
		a. Rotor (23)	Mount	Use vise
		b. Shaft nut (24)	Remove	
		c. Lock washer (25)	Remove and discard	
		d. Shaft collar (26)	Remove	
		e. Drive end frame (1)	Remove	From rotor (23)
		f. Three screws (27)	Remove	
		g. Ball bearing retainer plate (28)	Remove	
		h. Bearing housing on drive end frame (1)	Back up	Use front cover seal installer tool
		i. Ball bearing (29)	Remove	Use valve guide installer tool and press bearing out of end frame (1)
		j. Grease slinger washer (30)	Remove and discard	
CLEANING				
		CAUTION Do not clean stator or rotor with cleaning solvent.		
4		Stator (4) and rotor (23)	Clean	Wipe with clean, soft, absorbent, lintfree cloth

3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS

CLEANING (cont)

WARNING

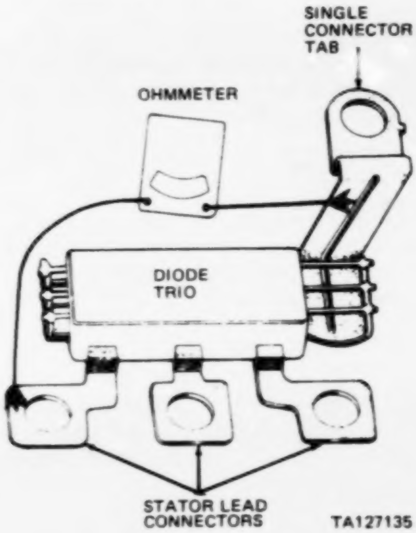
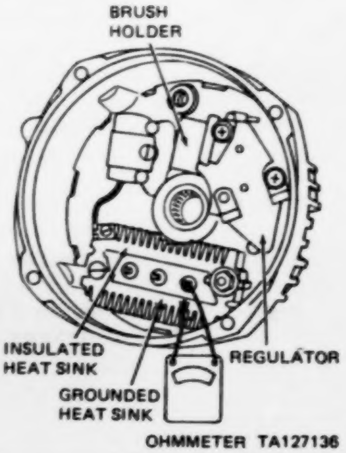
Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

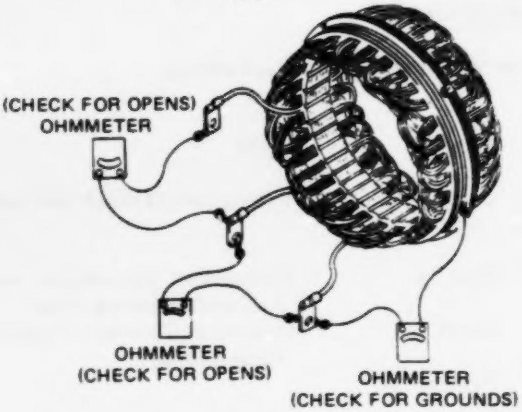
STEP	LOCATION	ITEM	ACTION	REMARKS
5		All other parts	Clean	Use clean, soft, absorbent, lintfree cloth moistened with cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
6		Drive end frame (1) and slip ring end frame (2)	Inspect	Replace if cracked, worn, damaged or distorted
7		Stator (4)	Inspect	Replace if worn, damaged, discolored, unwound or evidence of over-heating
8		Bearings (22 and 29)	Inspect	Replace if worn, cracked, pitted or damaged
9		Ball bearing retainer plate (28)	Inspect	Replace if retainer plate felt is hard or worn
10		Rotor (23)	Inspect	Replace if worn, damaged, cracked, distorted, damaged threads or slip rings damaged or scored
11		All other parts	Inspect	Replace if worn, cracked, damaged or distorted

3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING				
		CAUTION Do not use 110 volt test lamp to test diode trio.		
12		Diode trio (8)  SINGLE CONNECTOR TAB OHMMETER DIODE TRIO STATOR LEAD CONNECTORS TA127135	Test	Set ohmmeter to lowest resistance range. Connect ohmmeter leads to single connector tab and one of three stator lead connectors as shown. Observe reading. Reverse ohmmeter leads and observe reading. Repeat procedure with each of two remaining stator lead connectors. Readings should not be identical in each test. There should be one low and one high reading for each test. If readings are either both high or low, replace the diode trio
13		Rectifier bridge assembly (12)  BRUSH HOLDER INSULATED HEAT SINK GROUNDED HEAT SINK REGULATOR OHMMETER TA127136	Test	Use ohmmeter. Connect prod to grounded heat sink and the base of one of the three terminals as shown. Observe reading. Reverse prods. Observe reading. If readings are identical, replace bridge. Repeat procedure with remaining two terminals. Connect prods to insulated heat sink and one of three terminals. Observe reading. Reverse prods. Observe reading. If readings are identical, replace rectifier bridge assembly. Repeat procedure with each of two remaining terminals

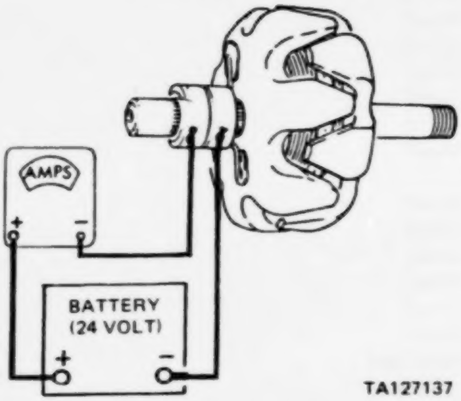
3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
14		Stator (4)	Test	Use an ohmmeter to check. Connect test prods as shown. If meter reading is low when connected to any stator lead and frame, the windings are grounded. If the meter reading is high when connected between each pair of stator leads, the windings are open. If stator winding is grounded or open or if evidence of short is observed, replace stator



TA127504

STEP	LOCATION	ITEM	ACTION	REMARKS
15		Rotor (23)	Test	Use 110 volt test lamp. Connect test lamp from rotor slip ring to rotor shaft. If lamp lights, the field windings are grounded. Connect test lamp leads to each rotor slip ring. If lamp fails to light, field windings are open. Connect ammeter and battery to rotor as shown. If ammeter indicates more than 4.0 to 4.5 amperes, rotor field windings are shorted. If field windings are grounded, open or have shorted, replace rotor



TA127137

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
16	Drive end frame (1)	a. Grease slinger washer (30)	Install	
		b. Inside of bearing area on end frame (1)	Back up	Use camshaft gear remover tool
		c. Ball bearing (29)	Install	Press on closed end of bearing until flush with end frame housing
		d. Ball bearing retainer plate (28)	Install	Use valve guide installer tool until retainer seats against bearing (29)
		e. Three screws (27)	Install and tighten	Until retainer (28) is securely mounted

3-12. ALTERNATOR REPAIR (cont)

REASSEMBLY (cont)

CAUTION

Do not overtighten vise. Overtightening may distort and damage rotor.

STEP	LOCATION	ITEM	ACTION	REMARKS
17	Rotor (23)	a. Rotor (23)	Mount	In vise
		b. Drive end frame (1)	Install	
		c. Shaft collar (26), lock washer (25) and shaft nut (24)	Install and tighten	Tighten nut (24) hand tight only
18	Slip ring end frame (2)	a. Slip ring end frame (2)	Back up	Use camshaft gear remover tool on area surrounding bearing recess
		b. Roller bearing (22)	Install	Press on until bearing is flush with end frame housing
		c. Outer terminal stud insulator (20)	Position	
		d. Terminal stud (21)	Install	
		e. Voltage regulator (19)	Position	
		f. Nut (18)	Install	
		g. Brush holder (17)	Position	
		h. Screw (16)	Install	
		i. Screw (15)	Install	
		j. Two screws (14)	Install	
		k. Inner terminal stud insulator (13)	Install	
		l. Rectifier bridge assembly (12)	Install	
		m. Relay terminal (11)	Install	
		n. Nut (10)	Install	
		o. Two screws (9)	Install	
		p. Diode trio (8)	Install	
		q. Capacitor (7)	Install	
		r. Two screws (6)	Install	
		s. Stator (4)	Install and connect	

CAUTION

Use care to not damage stator.

		t. Three nuts (5)	Install	
		u. Drive end frame (1)	Position	Align positioning marks on frames (1, 2)

CAUTION

Use care not to damage rotor and stator. Do not use hammer to install drive end frame in slip ring end frame. Hand push around entire circumference.

3-12. ALTERNATOR REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
18 (cont)		v. Four thru bolts (3)	Install and tighten	Tighten alternately until end frames are securely fastened

3-13. STARTER AND SOLENOID REPAIR

This task covers:
- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Testing
- e. Reassembly

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

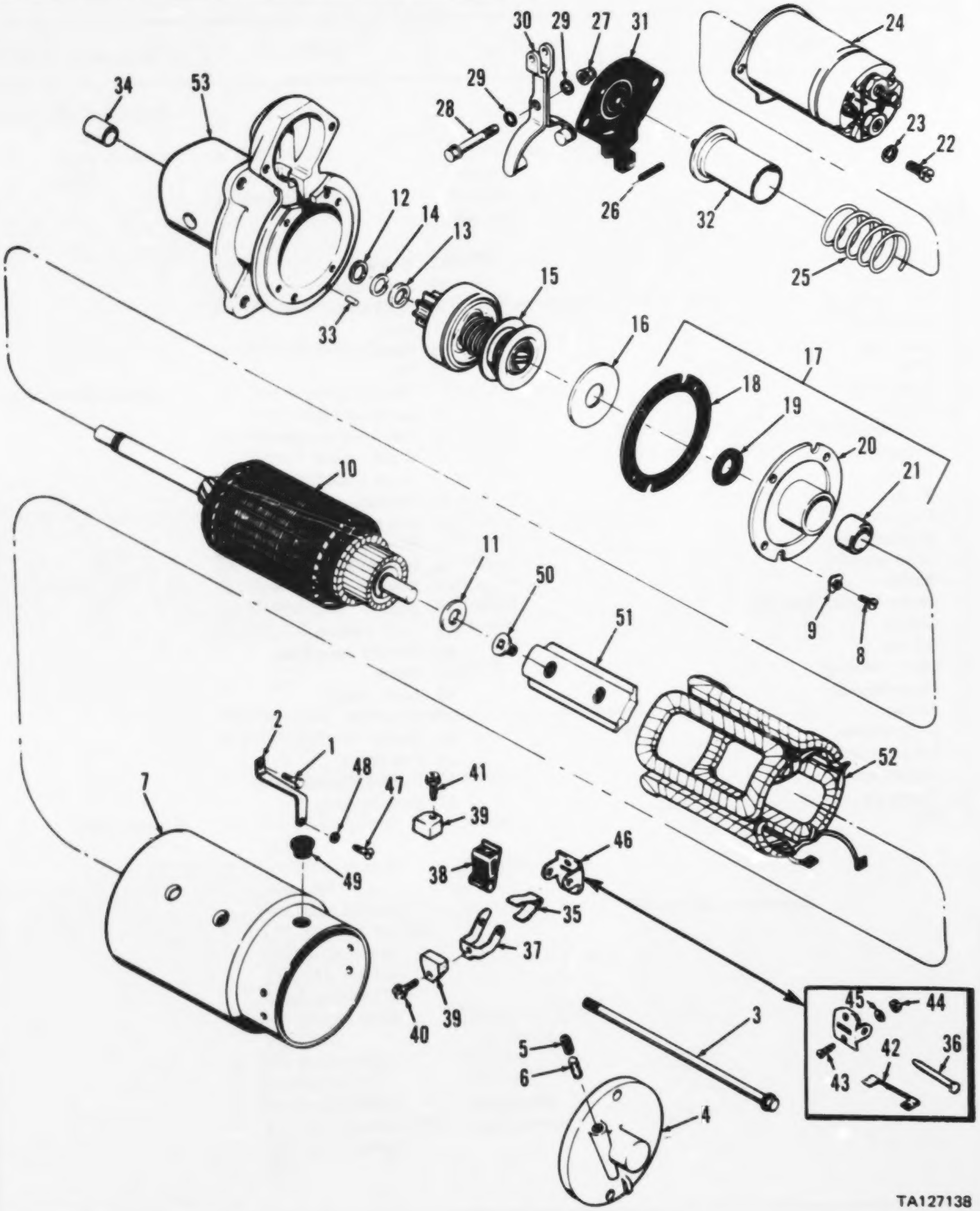
Cleaning solvent P-D-680
Clean cloths
Gasket
Oil seal
Lubricant (FSCM 16764 P/N 1960954)
Engine oil (MIL-L-2104, SAE grade 10)
Sealer (FSCM 16764 P/N 1050026)

EQUIPMENT CONDITION

Paragraph	Condition Description
2-27a	Starter and solenoid removed from vehicle.

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Drive housing (53)	a. Screw (1)	Remove	
		b. Connector (2)	Detach	From solenoid (24)
		c. Two through bolts (3)	Remove	
		d. End frame (4)	Remove	
		e. Pipe plug (5) and wick (6)	Remove	From end frame (4)
		f. Two screws (8) and lock washers (9)	Remove	
		g. Armature (10)	Remove	
2	Armature (10) and drive assembly (15)	a. Washer (11)	Remove and discard	
		b. Washer (12)	Remove and discard	
		c. Stop collar (13)	Press forward	Use a 1/2 inch pipe coupling, or an old pinion, to press collar toward armature to expose retaining ring (14)
		d. Retaining ring (14)	Remove	Use pliers
		e. Stop collar (13)	Remove	
		f. Drive assembly (15)	Remove	From armature shaft
		g. Washer (16)	Remove and discard	
		h. Center bearing assembly (17)	Remove	

3-13. STARTER AND SOLENOID REPAIR (cont)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3-13. STARTER AND SOLENOID REPAIR (cont)

KEY

1. Screw
2. Connector
3. Through bolts
4. End frame
5. Pipe plug
6. Wick
7. Field frame
8. Screws
9. Lock washers
10. Armature
11. Washer
12. Washer
13. Stop collar
14. Retaining ring
15. Drive assembly
16. Washer
17. Center bearing assembly
18. Gasket
19. Oil seal
20. Center bearing
21. Sleeve bearing
22. Screws
23. Lock washers
24. Solenoid switch
25. Plunger spring
26. Spring pin
27. Nut
28. Screw
29. Seal washers
30. Shift lever
31. Boot
32. Plunger
33. Pin
34. Sleeve bearing
35. Brush springs
36. Brush support pins
37. Brush holder
38. Brush holder
39. Brushes
40. Screws
41. Screws
42. Ground brush leads
43. Screws
44. Nuts
45. Lock washers
46. Control assemblies
47. Screw
48. Lock washer
49. Grommet
50. Screws
51. Pole shoes
52. Field coil assembly
53. Drive housing

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
3	Center bearing (20)	a. Gasket (18)	Remove and discard	
		b. Oil seal (19)	Remove and discard	
		NOTE Do not remove sleeve bearing (21) unless replacement is required.		
		c. Sleeve bearing (21)	Remove	
4	Drive housing (53)	a. Two screws (22) and lock washers (23)	Remove	
		b. Solenoid switch (24)	Remove	Pull straight out from drive housing (53)
		c. Plunger spring (25)	Remove	From plunger (32)
		d. Spring pin (26)	Remove	
		e. Nut (27)	Remove	
		f. Screw (28)	Remove	
		g. Two seal washers (29)	Remove	
		h. Shift lever (30)	Remove	
		i. Boot (31)	Remove	
		j. Plunger (32)	Remove	
		k. Pin (33)	Remove	
		NOTE Do not remove sleeve bearing (34) unless replacement is required as per inspection.		
		l. Sleeve bearing (34)	Remove	
5	Field frame (7)	a. Two brush springs (35)	Release	
		b. Two brush support pins (36)	Remove	
		c. Two brush holders (37, 38), two brushes (39), four screws (40, 41), and two brush springs (35)	Remove	Remove as one assembly
		d. Two ground brush leads (42)	Disconnect and and remove	
		e. Two screws (40)	Remove	
		f. Two screws (41)	Remove	
		g. Two brush holders (37, 38), brushes (39) and brush springs (35)	Disassemble and separate	

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
5 (cont)		h. Four screws (43)	Remove	
		i. Four nuts (44)	Remove	
		j. Four lock washers (45)	Remove and discard	
		k. Two control assemblies (46)	Remove	

NOTE

Do not remove screw (47), lock washer (48), connector (2) or grommet (49) unless replacement is required.

STEP	LOCATION	ITEM	ACTION	REMARKS
		l. Screw (47)	Remove	
		m. Lock washer (48)	Remove	
		n. Connector (2)	Remove	
		o. Grommet (49)	Remove	

NOTE

Do not remove field coil assembly (52), pole shoes (51) or screws (50) unless parts need replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		p. Eight screws (50)	Remove	
		q. Four pole shoes (51)	Remove	
		r. Field coil assembly (52)	Remove and release	
CLEANING				
6		Armature (10), drive assembly (15), solenoid switch (24), brushes (39), grommet (49) and coil assembly (52)	Clean	Wipe with a clean, dry, lint-free cloth only. Do not use cleaning solvent

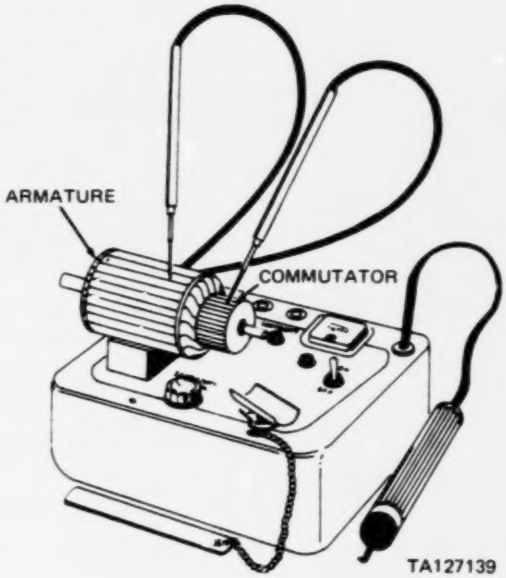
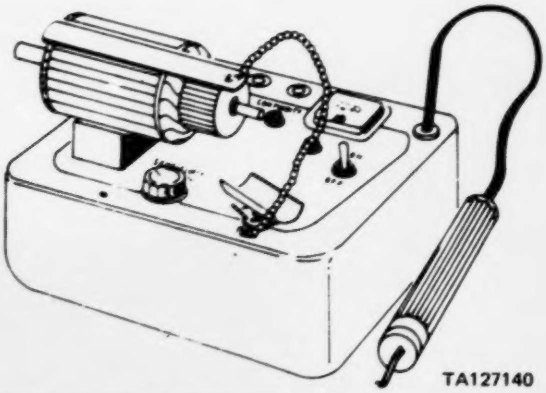
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

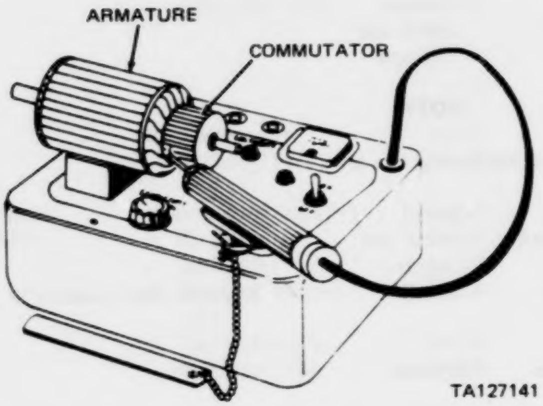
3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
6 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
7		All other parts	Clean	Use clean cloth moistened with cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
8		Brushes (39)	Inspect	Replace if cracked, crazed, distorted, or if brush wear exceeds one half of new brush length
9		Brush holder (37, 38)	Inspect	Replace if cracked, worn or distorted, or if brush does not move freely in holder
10		Brush springs (35)	Inspect	Inspect for wear, cracks, distortion or discoloration. Check brush spring tension to check that brushes are held firmly. If tension is weak or if any other condition is observed, replace spring
11		Sleeve bearings (21, 34)	Inspect	Replace if worn, cracked, pitted or burred
12		Drive assembly (15)	Inspect	Replace if worn, damaged, distorted, or pinion teeth cracked, chipped, worn or damaged, or pinion does not turn freely in over-running direction
13		Armature (10)	Inspect	Replace if cracked, worn, damaged or distorted or commutator rough or out of round
14		Solenoid switch (24)	Inspect	Replace if cracked, worn, damaged or distorted
15		All other parts	Inspect	Replace if worn, cracked, damaged or distorted

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING				
16		a. Armature (10)  TA127139	Test for grounded winding	Place armature in growler and turn power on. Touch one test probe to armature core, the other probe to commutator, as shown. If test lamp glows, the armature winding, or commutator is grounded
		b. Armature (10)  TA127140	Test for shorted winding	Position armature in growler. Turn on power. Use steel blade provided with tester. Hold blade parallel with and touching the armature core segment, as shown

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
16 (cont)				Rotate armature slowly one or more revolutions. If the armature is shorted, the steel blade will vibrate. Turn power off. Position armature in growler, as shown. Turn power on
		c. Armature (10)	Test commutator bars	Follow directions supplied with growler and test commutator bars for abnormal readings. Abnormal readings will indicate a short, open or poor connection. If testing indicates commutator is grounded, the armature is shorted or commutator readings indicate a short, or an open or poor connection, replace armature
17		Field coil assembly (52)	Test	Disconnect field coil ground connection. Use test lamp. Connect one test probe of the test lamp to the connector (2) and the other probe to the frame (7). If the test lamp lights, the field coils (52) are grounded. If coils are grounded, remove and replace coils. Touch test probes to each end of the field coil windings. If the test lamp does not light, the field coils are open. If coils are open, replace coil assembly (52)
REASSEMBLY				
18	Field frame (7)	a. Field coil assembly (52)	Assemble and position	If removed
		b. Four pole shoes (51)	Position	
		c. Eight screws (50)	Install	
		d. Grommet (49)	Install	If removed

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
18 (cont)		e. Connector (2)	Position	
		f. Lock washer (48) and screw (47)	Install and tighten	
		NOTE Always replace brushes and springs as a set.		
19	Brush holder (37, 38)	a. Two brushes (39)	Install	
		b. Four screws (40 and 41)	Install and tighten	
		c. Two brush springs (35)	Install	Assemble with holders (37, 38)
20	Field frame (7)	a. Two control assemblies (46)	Position	
		b. Four screws (43)		
		c. Four lock washers (45)	Install	
		d. Four nuts (44)	Install	
		e. Two brush support pins (36)	Install	
		f. Two brush holder assemblies (37, 38)	Position and install	Place in control assembly (46). Push holders and spring to bottom of control assembly and rotate spring to engage the slot in the assembly
		g. Two ground brush leads (42)	Connect	
21	Center bearing (20)	a. Sleeve bearing (21)	Install	If removed
		b. Oil seal (19)	Install	
		c. Gasket (18)	Install	
22	Armature (10)	a. Center bearing assembly (17)	Install	
		b. Washer (16)	Install	
		c. Drive assembly (15) and armature (10) shaft	Lubricate and position	Apply light coat of lubricant to drive end of armature shaft. Slide drive assembly onto shaft with pinion away from armature
		d. Stop collar (13)	Position	Face cupped surface of collar away from armature
		e. Armature (10)	Position	Stand on a wood block with commutator down
		f. Retaining ring (14)	Install	Tap into place with small block of wood and a hammer

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
22 (cont)		g. Stop collar (13)	Install	Force stop collar over retaining ring. Place a suitable washer over retaining ring. Squeeze collar and washer together using pliers. Remove and discard washer
		h. Washer (12)	Install	
		i. Washer (11)	Install	
23	Drive housing (53)	a. Sleeve bearing (34)	Install	If removed
		b. Pin (33)	Install	
		c. Armature (10)	Install	
		d. Two lock washers (9)	Position	
		e. Two screws (8)	Install	
		f. Shift lever (30)	Install	Engage with drive assembly
		g. Two seal washers (29)	Position	
		h. Screw (28)	Install	
		i. Nut (27)	Install	
		j. Boot (31)	Seal and position	Apply sealer to drive housing frame
		k. Plunger (32)	Position	On shift lever (30)
		l. Spring pin (26)	Install	Press on plunger (32) and shift lever (30)
		m. Plunger spring (25)	Position	Over plunger (32)
		n. Solenoid switch (24)	Position	Against drive housing (53)
		o. Two lock washers (23) and screws (22)	Install and tighten	Until solenoid (24) is securely mounted
		p. Field frame (7)	Position	Over armature (10)

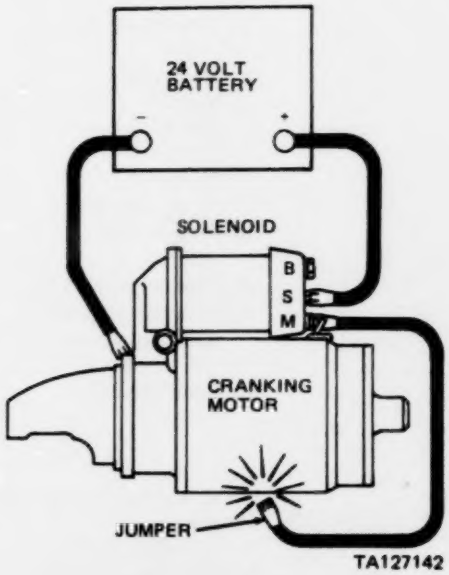
CAUTION

Use care to not damage brushes when positioning frame over armature.

STEP	LOCATION	ITEM	ACTION	REMARKS
		q. Field frame (7) and solenoid switch (24)	Seal	Apply sealer between frame, solenoid flange, and solenoid junction

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
24	End frame	a. Wick (6)	Lubricate and install	Saturate with engine oil before installing
		b. Pipe plug (5)	Install	
25	Drive housing (53)	a. End frame (4)	Lubricate and position	Apply light coat of lubricant to frame bushing; then slide on armature shaft and push against field frame (7)
		b. Two through bolts (3)	Install and tighten	Until end frame (4) is securely mounted
		c. Field coil connector (2)	Insulate	Wrap with electrical tape
		d. Starter and solenoid	Connect	To test circuit as shown



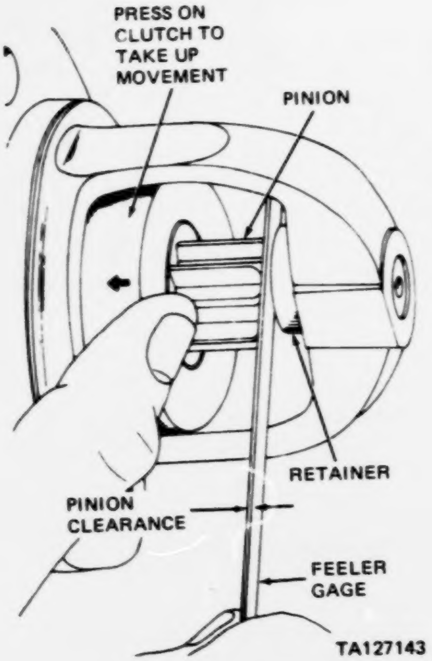
CAUTION

Check pinion clearance quickly to avoid overheating and damaging solenoid windings.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Jumper lead	Momentarily connect	From solenoid M terminal to starter case (to shift pinion into cranking position)

3-13. STARTER AND SOLENOID REPAIR (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
25 (cont)		f. Drive assembly (15) pinion	Check clearance	Push clutch back as far as possible toward armature, and check clearance as shown
		g. Starter and solenoid	Disconnect	From pinion clearance test set-up
		h. Field coil connector (2)	Remove tape and position	On M terminal of solenoid switch (24)
		i. Screw (1)	Install and tighten	Until field coil connector (2) is securely mounted


PRESS ON CLUTCH TO TAKE UP MOVEMENT
PINION
RETAINER
PINION CLEARANCE
FEELER GAGE
TA127143

NOTE

Pinion clearance must measure between 0.010 and 0.140 inch to prevent buttons on the shift lever yoke (30) from rubbing on the clutch collar during cranking. If clearance does not fall within limits, recheck for proper assembly and replace all worn parts.

3-14. INSTRUMENT PANEL REPLACEMENT

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

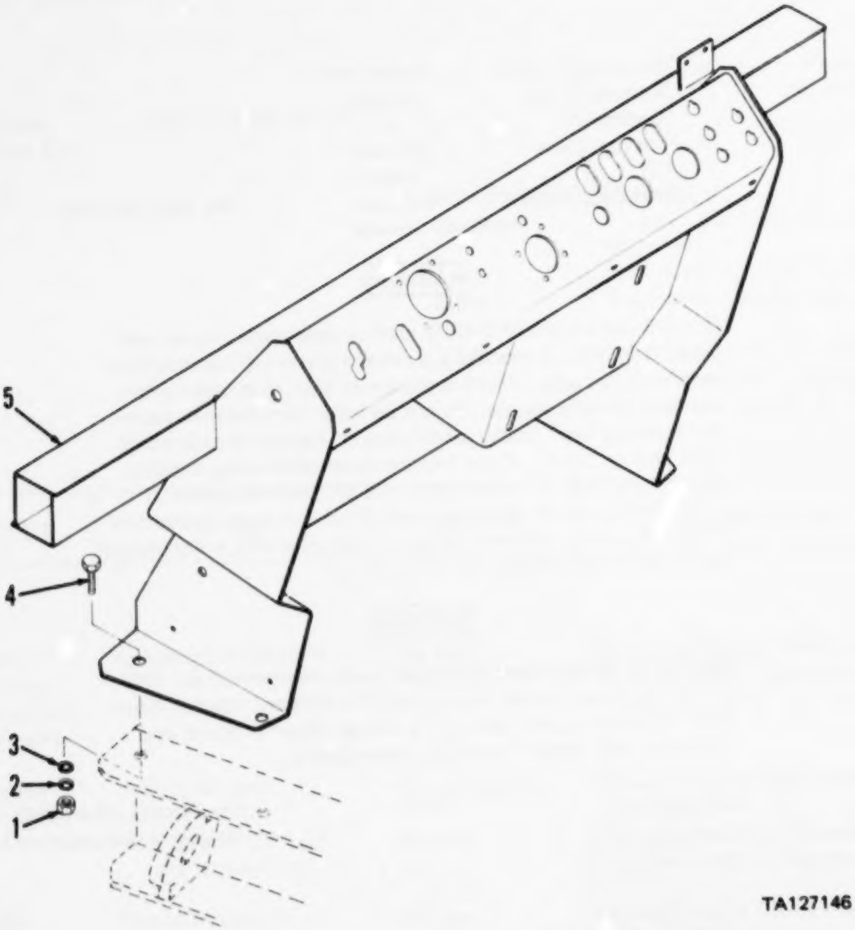
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
2-28	Flood light switches and circuit breakers, start switch, vehicle lights switch, ignition switch and circuit breaker, lockout relay, and warning lights and diodes removed.
2-18b	Gages removed.
2-30a	Two front floodlights mounted on fender support brackets removed.
2-32a	Horn removed.
2-38b	Transmission linkage and levers removed.
2-52a	Roll over protective structure removed.
2-53b, steps 2 and 3	Front fenders retaining hardware removed.
2-56b	Hydraulic control levers and linkages removed.
3-24a	Steering wheel and column removed.
3-24b	Steering gear removed.
3-30a	Control valve removed.

3-14. INSTRUMENT PANEL REPLACEMENT (cont)



TA127146

KEY

1. Nuts
2. Lock washers
3. Washers
4. Cap screws
5. Instrument panel

3-14. INSTRUMENT PANEL REPLACEMENT (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment	a. Four nuts (1), lock washers (2) and washers (3)	Loosen and remove	
		b. Four cap screws (4)	Lift and remove	
		c. Instrument panel (5)	Lift and remove	Use sling and hoist
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with compressed air
INSPECTION				
3		Nuts (1), washers (2 and 3) and cap screws (4)	Inspect	Replace if worn, or if threads damaged
4		Instrument panel (5)	Inspect	Repair broken welds or cracks by welding. Replace if severely cracked or damaged
INSTALLATION				
5	Operator's compartment	a. Instrument panel (5)	Position	In operator's compartment, with frame and instrument panel mounting holes aligned
		b. Four cap screws (4) washers (3), lock washers (2) and nuts (1)	Install and tighten	Until instrument panel is securely mounted

3-15. WIRING HARNESS REPLACEMENT

a. Front Wiring Harness

This task covers
a. Removal
b. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Front wiring harness
Tie strap

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.
2-34a	Front wiring harness connector disconnected.
2-53h	Noise baffle mat rod removed and mat pulled up and over instrument panel for access to bottom of instrument panel.

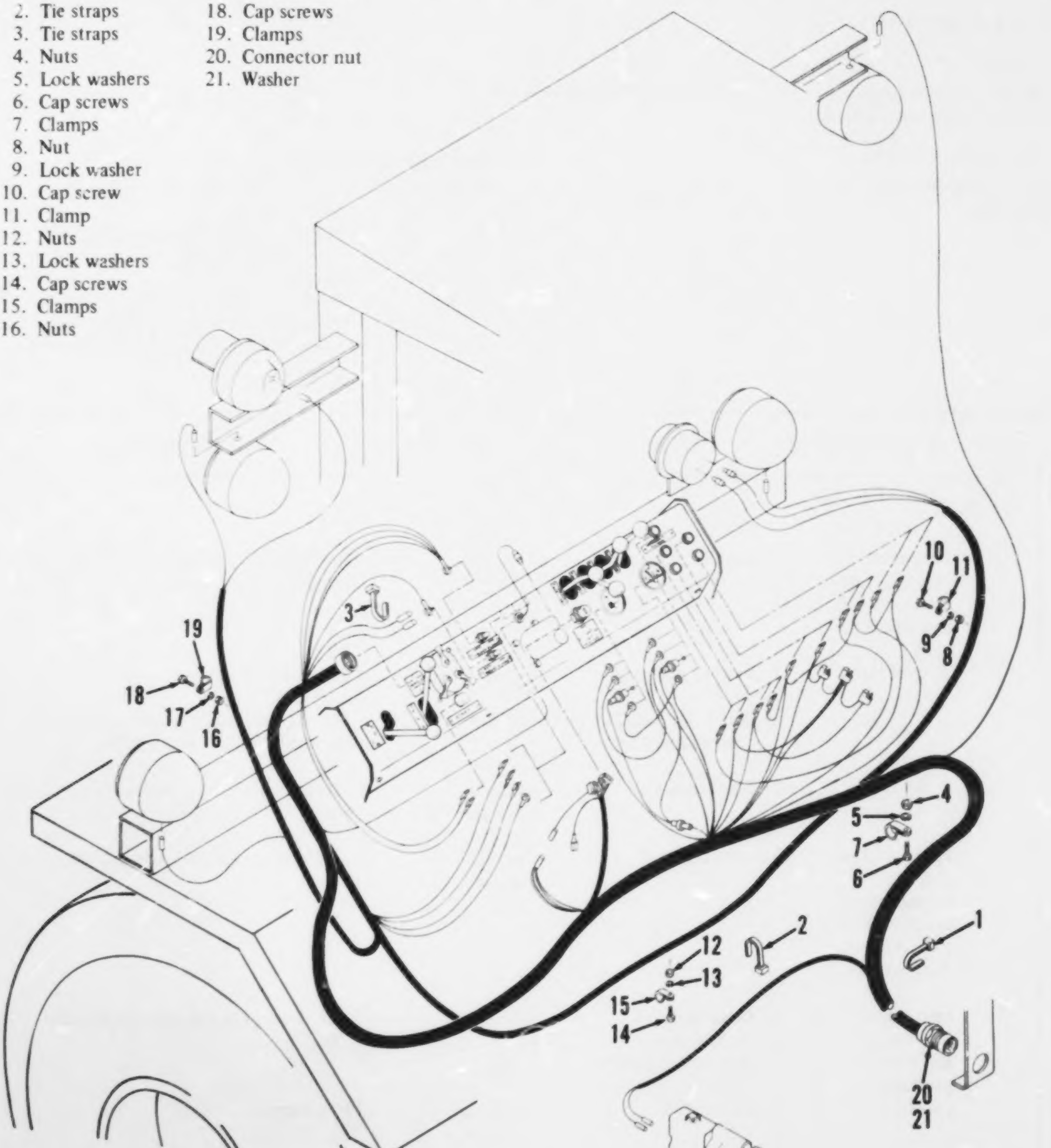
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel bottom, stop light switch, and ROPS posts	All harness connectors	Tag and disconnect	Tag terminals of all electrical components and disconnect harness leads
2	Rear of transmission	a. Four tie straps (1)	Cut and discard	Cut and remove from harness and hydraulic return hose
		b. Connector nut (20) and washer (21)	Remove	Turn counterclockwise and remove from harness connector and bracket
3	Brake tube under floor	Two tie straps (2)	Cut and discard	Cut and remove from harness to stop light switch and brake tube
4	Harness loops at 6 and 10 ampere circuit breakers, bottom of instrument panel	Two tie straps (3)	Cut and discard	Cut and remove from loops in harness wire
5	Instrument panel rear and right hand side panel	a. Three nuts (4), lock washers (5), and cap screws (6)	Remove	From clamps (7) and instrument panel
		b. Clamps (7)	Spread and remove	From harness

3-15. WIRING HARNESS REPLACEMENT (cont)

a. Front Wiring Harness (cont).

KEY

1. Tie straps
2. Tie straps
3. Tie straps
4. Nuts
5. Lock washers
6. Cap screws
7. Clamps
8. Nut
9. Lock washer
10. Cap screw
11. Clamp
12. Nuts
13. Lock washers
14. Cap screws
15. Clamps
16. Nuts
17. Lock washers
18. Cap screws
19. Clamps
20. Connector nut
21. Washer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3-15. WIRING HARNESS REPLACEMENT (cont)

a. Front Wiring Harness (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
6	Right hand instrument end panel	a. Nut (8), lock washer (9) and cap screw (10) b. Clamp (11)	Remove Spread and remove	From clamp (11) and end panel From harness wire
7	Instrument panel front	a. Three nuts (12), lock washers (13) and cap screws (14)	Remove	From clamps (15) and instrument panel
8	Left hand instrument side panel	a. Three nuts (16), lock washers (17) and cap screws (18)	Remove	From clamps (19) and side panel
9	Front wiring harness	a. Front wiring harness b. Warning light diodes	Remove Grasp and pull	From vehicle From harness (para 2-28e)
INSTALLATION				
10		New front wiring harness	Position	On vehicle
11	Instrument panel	a. Clamps (7, 11, 15 and 19) b. Cap screws (6, 10, 14 and 18), lock washers (5, 9, 13, and 17) and nuts (4, 8, 12 and 16)	Position Install and tighten	Over harness and against instrument panel mounting holes Until clamps (7, 11, 15 and 19) are securely mounted
12		a. New tie straps (1, 2 and 3) b. All harness leads c. Warning light diodes d. All electrical systems	Loop and tie Connect Push on Check	Around harness, hydraulic return hose and brake tube To electrical components. Observe tags on component terminals for correct connection Harness connectors (para 2-28e) For proper operation

3-15. WIRING HARNESS REPLACEMENT (cont)

b. Rear Wiring Harness.

This task covers:
a. Removal
b. Installation

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Rear wiring harness
Tie strap

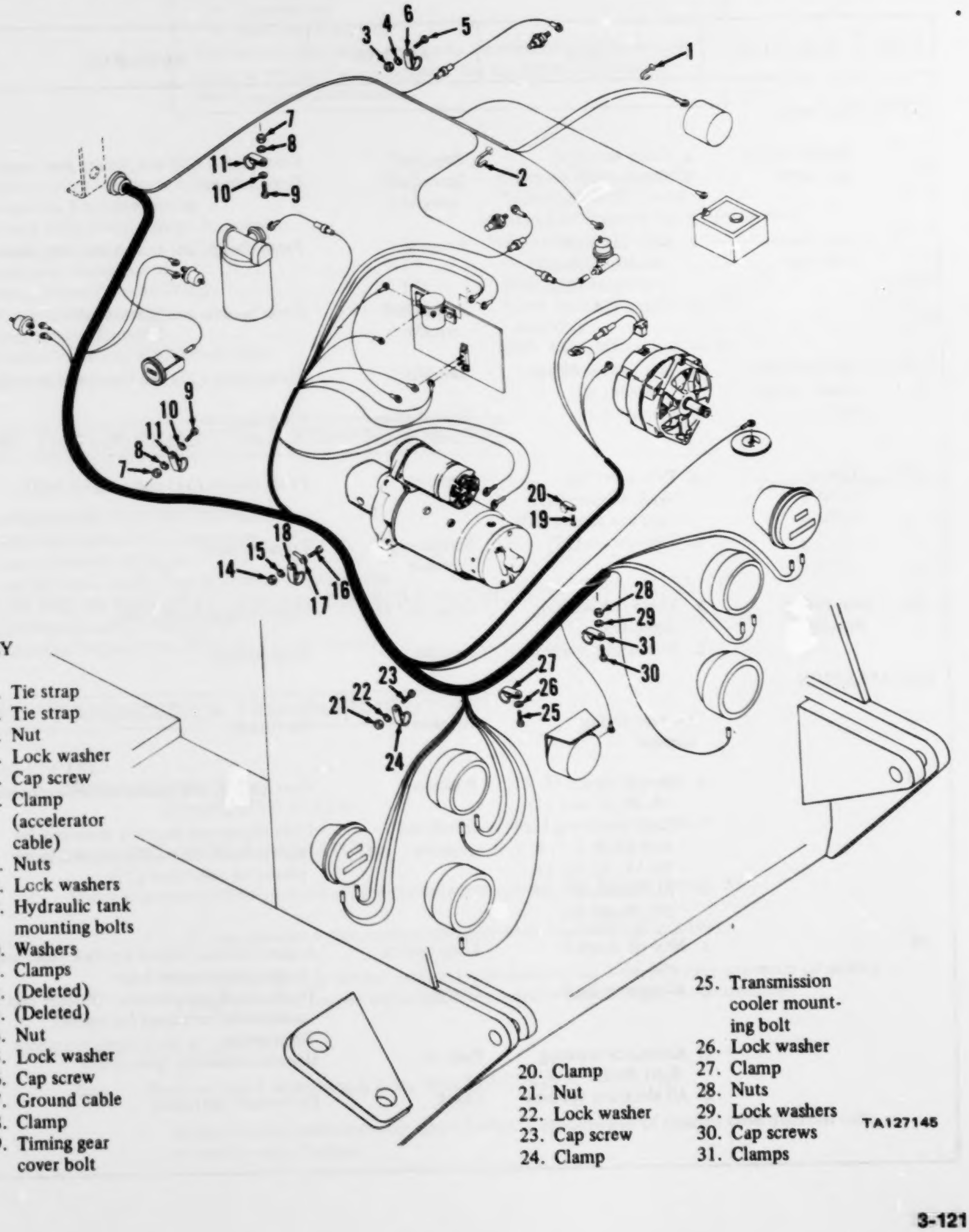
EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off.
2-33b	Battery ground cable disconnected.
2-34a	Front wiring harness connector disconnected.
	Radiator grille open.
2-53c	Side panels removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1		All harness connectors and leads	Tag and disconnect	Tag terminals of all electrical components and disconnect harness leads
2	Engine dipstick tube	Tie strap (1)	Cut and discard	Cut and remove from harness and dipstick tube
3	Transmission cooler hose	Tie strap (2)	Cut and discard	Cut and remove from harness and transmission cooler hose
4	Accelerator cable	a. Nut (3), lock washer (4) and cap screw (5)	Remove	From clamp (6)
		b. Clamp (6)	Spread and remove	From harness and accelerator cable
5	Hydraulic tank, front	a. Two nuts (7) lock washers (8), bolts (9) and washers (10)	Remove	From clamps (11) and hydraulic tank
		b. Clamps (11)	Spread and remove	From harness
6	Left hood support plate and rear frame	a. Nut (14), lock washer (15), cap screw (16) and ground cable (17)	Remove	From clamp (18)
		b. Clamp (18)	Spread and remove	From harness

3-15. WIRING HARNESS REPLACEMENT (cont)

b. Rear Wiring Harness (cont).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KEY

1. Tie strap
2. Tie strap
3. Nut
4. Lock washer
5. Cap screw
6. Clamp (accelerator cable)
7. Nuts
8. Lock washers
9. Hydraulic tank mounting bolts
10. Washers
11. Clamps
12. (Deleted)
13. (Deleted)
14. Nut
15. Lock washer
16. Cap screw
17. Ground cable
18. Clamp
19. Timing gear cover bolt
20. Clamp
21. Nut
22. Lock washer
23. Cap screw
24. Clamp
25. Transmission cooler mounting bolt
26. Lock washer
27. Clamp
28. Nuts
29. Lock washers
30. Cap screws
31. Clamps

3-15. WIRING HARNESS REPLACEMENT (cont)

b. Rear Wiring Harness (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
7	Engine timing gear cover	a. Cover bolt (19)	Remove	From clamp (20) and timing gear cover
		b. Clamp (20)	Spread and remove	From harness
8	Left chassis side plate	a. Nut (21), lock washer (22) and cap screw (23)	Remove	From clamp (24) and chassis side plate
		b. Clamp (24)	Spread and remove	From harness and battery cables
9	Transmission cooler, lower left	a. Bolt (25) and lock washer (26)	Remove	From clamp (27) and transmission cooler
		b. Clamp (27)	Spread and remove	From harness
10	Top of radiator baffle	a. Two nuts (28), lock washers (29), and cap screws (30)	Remove	From clamps (31) and radiator baffle
		b. Two clamps (31)	Spread and remove	From harness
11	Rear wiring harness	a. Alternator warning light diode	Grasp and pull	From harness (para 2-26)
		b. Rear wiring harness	Remove	From vehicle
INSTALLATION				
12		New rear wiring harness	Position	On vehicle
13		a. Harness clamps (6, 11, 18, 24, 27 and 31)	Position	Over harness and against mounting holes
		b. Clamp mounting hardware (3, 4, 5, 7, 8, 9, 10, 14, 15, 16, 19, 21, 22, 23, 25, 26, 28, 29 and 30)	Install and tighten	Until clamps are securely mounted; be sure ground cable (17) terminal is placed on cap screw (16)
14		a. New tie straps (1 and 2)	Loop and tie	Around harness, engine dipstick tube, and transmission cooler hose
		b. All harness leads	Connect	To electrical components. Observe tags on component terminals for correct connection
		c. Alternator warning light diode	Push on	Harness connector (para 2-26)
		d. All electrical systems	Check	For proper operation

Section III. POWER TRAIN MAINTENANCE

This section contains the information you'll need to maintain the:
- Transmission
- Front and rear axles

It gives you instructions on how to troubleshoot problems, and repair or replace the components that are within the scope of direct support maintenance.

	Para
Troubleshooting Symptom Index	3-16
Transmission Troubleshooting	3-17
Axles and Differential Carrier Assemblies Troubleshooting	3-18
Transmission Maintenance	3-19
Transmission Pressure Checks	3-19a
Transmission Mounts	3-19b
Transmission Removal	3-19c
Control Valve and Modulation Valve Assemblies	3-19d
Charging Pump Assembly	3-19e
Transmission Oil Cooler	3-19f
Axles and Differential Carrier Assemblies Maintenance	3-20
Front Axle Assembly	3-20a
Rear Axle Assembly	3-20b
Front Axle Differential Carrier Assembly	3-20c
Rear Axle Differential Carrier Assembly	3-20d

3-16. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
TRANSMISSION TROUBLESHOOTING		
High transmission oil temperature	3-17/1	3-123
Loss of drive in all ranges	3-17/2	3-123
Loss of power and/or loss of drive in any one range	3-17/3	3-124
AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES TROUBLESHOOTING		
Continuous axle or wheel noise	3-18/1	3-125
Lubricant leaking from differential carrier assembly	3-18/2	3-125

3-17. TRANSMISSION TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. HIGH TRANSMISSION OIL TEMPERATURE

Check transmission lube pressure at lube pressure port (para 3-19a, steps 6 through 8).

a. If lube pressure is low, replace charging pump assembly (para 3-19e).

b. If lube pressure is normal, replace transmission (para 3-19c) (torque converter oil sealing rings worn and require replacement) and notify general support maintenance.

2. LOSS OF DRIVE IN ALL RANGES

Step 1. Perform step 5 of paragraph 2-36, MALFUNCTION 4.

Replace control valve assembly (para 3-19d); if replacement of control valve does not help, proceed to step 2 below.

3-17. TRANSMISSION TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. LOSS OF DRIVE IN ALL RANGES (cont)

Step 2. Perform steps 1, 3, 4, and 5a through 5f of paragraph 3-19a.

a. If pressure gage indication is abnormal, proceed to step 3 below.

b. If pressure gage indication is normal, proceed to step 3 below.

Step 3. Perform steps 6 through 8 of paragraph 3-19a.

If lube pressure indication is abnormal, replace charging pump assembly (para 3-19e) and repeat step 2 above. If pressure gage indication obtained in step 2 above is still abnormal, replace transmission (para 3-19c) (torque converter oil sealing rings worn and require replacement) and notify general support maintenance.

3. LOSS OF POWER AND/OR LOSS OF DRIVE IN ANY ONE RANGE

Step 1. Perform steps 1, 3, 4, and 5a through 5f of paragraph 3-19a.

a. If pressure gage indication is abnormal, proceed to step 2 below.

b. If pressure gage indication is normal, proceed to step 3 below.

Step 2. Perform steps 6 through 8 of paragraph 3-19a.

If lube pressure indication is abnormal, replace charging pump assembly (para 3-19e) and repeat step 1 above. If pressure gage indication obtained in step 1 is still abnormal, replace transmission (para 3-19c) (torque converter oil sealing rings worn and require replacement) and notify general support maintenance.

Step 3. Perform steps 1, 3, 4, and 5 of paragraph 3-19a.

a. If pressure indications normal in F (forward) but abnormal in R (reverse), replace transmission (para 3-19c) (reverse and second clutch group require repair) and notify general support maintenance.

b. If pressure indications normal in R (reverse) but abnormal in F (forward), replace transmission (para 3-19c) (forward clutch group requires repair) and notify general support maintenance.

c. If pressure indication in any one position of speed selector varies more than 5 PSI from other indications, replace transmission (para 3-19c) (clutch group associated with speed selector position in which pressure indication varied more than 5 PSI requires repair) and notify general support maintenance.

3-18. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. CONTINUOUS AXLE OR WHEEL NOISE

WARNING

Before raising wheel off ground, be sure that shipping lock pin is installed. Failure to do so may cause vehicle to turn and slip off jack or jack stands causing serious injury or death. If you are injured by falling equipment, obtain medical aid immediately.

Check axle shafts for damage (para 2-39f).

If axle shafts are not damaged, replace differential carrier assembly (para 3-20c or 3-20d) and notify general support maintenance.

2. LUBRICANT LEAKING FROM DIFFERENTIAL CARRIER ASSEMBLY

Step 1. Check if lubricant is leaking between axle housing and differential carrier assembly.

a. If lubricant is leaking between axle housing and differential carrier assembly, remove differential carrier assembly, clean mating surfaces, apply sealer, and reinstall (para 3-20c or 3-20d).

b. If lubricant is not leaking between axle housing and differential carrier assembly, proceed to step 2 below.

Step 2. Check if lubricant is leaking from differential carrier assembly housing (indicating cracked housing) or from area near yoke.

Remove and replace differential carrier assembly (para 3-20c or 3-20d) and notify general support maintenance (housing, oil slinger, or shims may require replacement).

3-19. TRANSMISSION MAINTENANCE

a. Transmission Pressure Checks.

This task covers checking the transmission pressure.

INITIAL SETUP

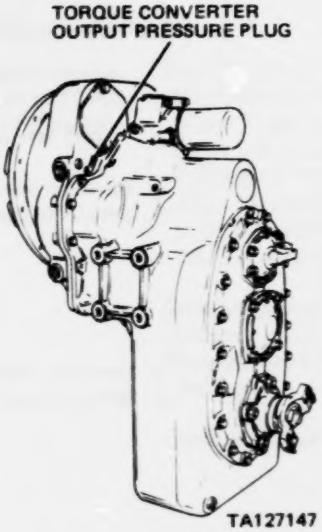
TOOLS		EQUIPMENT CONDITION	
		Paragraph	Condition Description
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654	2-53c	Side panels removed.
Pressure Gage, zero to 300 PSI range			
Hard Wooden Blocks (2), 6 by 6 by 18 inches			

MATERIALS/PARTS
None

PROCEDURE				NORMAL INDICATION	REMARKS
STEP	LOCATION	ITEM	ACTION		
		NOTE If vehicle cannot be driven to warm-up transmission oil, block wheels and proceed to step 2; otherwise, disregard step 2.			
1	Operator's compartment	a. Ignition switch	ON		
		b. START switch	Depress	Engine starts	
		c. Parking brake	Release		
		d. Direction selector	F		
		e. Speed selector	3		Drive vehicle for 15 minutes to warm transmission oil
		f. Ignition switch	OFF		
2	Operator's compartment	a. Ignition switch	ON		
		b. START switch	Depress	Engine starts	
		c. Parking brake	Apply		
		WARNING Don't allow anyone to stand in front of vehicle during following steps. Vehicle could move, causing serious injury or death to anyone standing in front of vehicle.			
		NOTE Apply service brakes as required during following steps.			
		d. Direction selector	F		
		e. Speed selector	3		
		f. Accelerator pedal	Depress half to three quarters		Until transmission oil temperature is 180 to 200 degrees F
		g. Ignition switch	OFF		

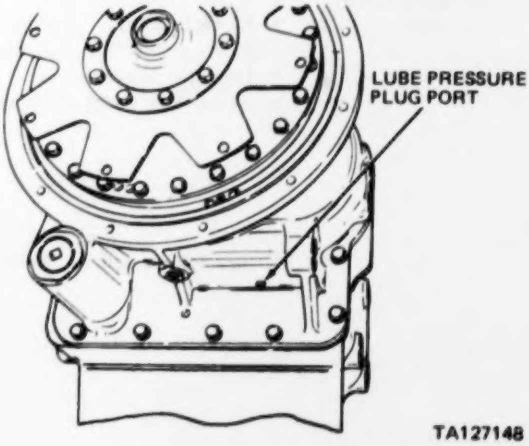
3-19. TRANSMISSION MAINTENANCE (cont)

a. Transmission Pressure Checks (cont).

PROCEDURE				NORMAL INDICATION	REMARKS
STEP	LOCATION	ITEM	ACTION		
3	Engine compartment, transmission	a. Torque converter output pressure plug	Remove		
		b. Zero to 300 PSI pressure gage	Connect		To torque converter output pressure port
4	Wheels	Wheel chocks	Position		Block wheels
5	Operator's compartment	a. Ignition switch	ON		
		b. START switch	Depress	Engine starts	
		c. Parking brake	Apply		
		d. Direction selector	N		
		e. Accelerator pedal	Depress	Pressure gage indicates 25 PSI minimum to 70 PSI maximum at 2000 RPM engine speed	Para 3-17, LOSS OF DRIVE IN ALL RANGES, step 2, and LOSS OF POWER AND/OR LOSS OF DRIVE IN ANY ONE RANGE, step 1
		f. Accelerator pedal	Release		

3-19. TRANSMISSION MAINTENANCE (cont)

a. Transmission Pressure Checks (cont).

PROCEDURE				NORMAL INDICATION	REMARKS
STEP	LOCATION	ITEM	ACTION		
5 (cont)		**WARNING** Don't allow anyone in front or rear of vehicle during following steps. **NOTE** Apply service brakes as required during following checks.			
		g. Direction selector	F		
		h. Speed selector	Shift thru 1, 2, and 3 while observing pressure gage	Pressure gage indicates 180-220 PSI with engine at idle (400 to 600 RPM). Clutch pressures must be within 5 PSI	Para 3-17, LOSS OF POWER AND/OR LOSS OF DRIVE IN ANY ONE RANGE, step 3
		i. Direction selector	R		
		j. Speed selector	Shift thru 1, 2, and 3 while observing pressure gage	Pressure gage indicates 180-220 PSI with engine at idle (400 to 600 RPM). Clutch pressures must be within 5 PSI	Para 3-17, LOSS OF POWER AND/OR LOSS OF DRIVE IN ANY ONE RANGE, step 3
		k. Ignition switch OFF			
6	Engine compartment, transmission	a. Pressure gage	Disconnect		From torque converter output pressure port
		b. Pressure plug	Reinstall		In torque converter
		c. Lube pressure port plug	Remove		
					
		d. Zero to 300 PSI pressure gage	Connect		To lube pressure port

3-19. TRANSMISSION MAINTENANCE (cont)

a. Transmission Pressure Checks (cont).

PROCEDURE				NORMAL INDICATION	REMARKS
STEP	LOCATION	ITEM	ACTION		
7	Operator's compartment	a. Ignition switch	ON		
		b. START switch	Depress	Engine starts	
		c. Direction selector	N		
		d. Accelerator pedal	Depress	Pressure gage indicates between 15 to 25 PSI at 2000 RPM engine speed	Para 3-17, HIGH TRANSMISSION OIL TEMPERATURE; LOSS OF DRIVE IN ALL RANGES, step 3; LOSS OF POWER AND/OR LOSS OF DRIVE IN ANY ONE RANGE, step 2
		e. Ignition switch	OFF		
8	Engine compartment, transmission	a. Pressure gage	Disconnect		From transmission lube pressure port
		b. Lube pressure port plug	Reinstall		In transmission lube pressure port
9	Wheels	Wheel chocks	Remove		Checks completed

3-19. TRANSMISSION MAINTENANCE (cont)

b. Transmission Mounts.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation

INITIAL SETUP

TOOLS

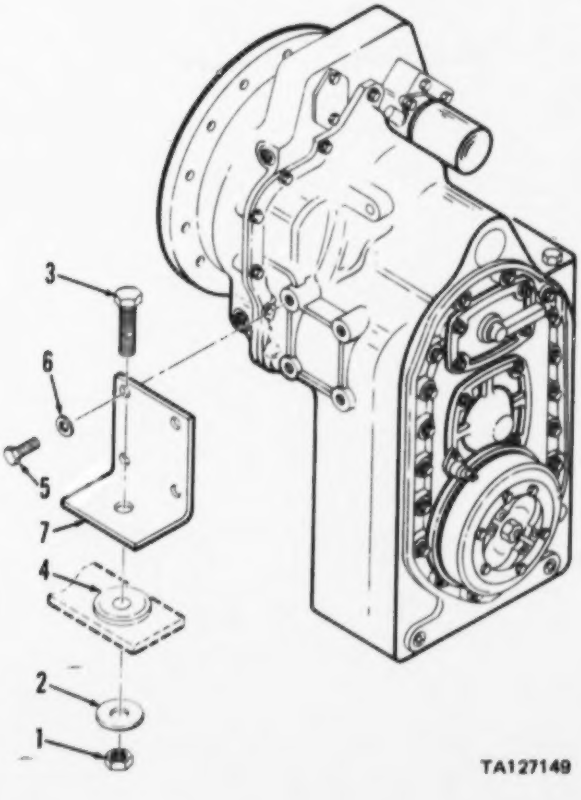
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Hard Wooden Blocks (2), 6 by 6 by 18 inches	

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Lock nut
Transmission mount

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, wheels blocked and parking brake applied.
2-53c	Side panels removed.

KEY
1. Lock nuts
2. Washers
3. Cap screws
4. Mount
5. Cap screws
6. Washers
7. Mount brackets



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3-19. TRANSMISSION MAINTENANCE (cont)

b. Transmission Mounts (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Engine compartment, front			

NOTE

Remove and reinstall transmission mount on one side only; then repeat procedure for remaining mount.

STEP	LOCATION	ITEM	ACTION	REMARKS
		a. Lock nut (1) and washer (2)	Loosen and remove	Discard lock nut (1)
		b. Cap screw (3)	Lift and remove	If necessary, gently tap threaded end of cap screw using hammer
		c. Transmission housing	Lift	Place jack under transmission housing on same side as mount being removed. Raise transmission and bracket (7) to relieve pressure on mount (4)
		d. Transmission mount (4)	Remove and discard	Pry and lift from vehicle frame

NOTE

Remove the following parts only if required for replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Four cap screws (5) and washers (6)	Loosen and remove	Support bracket (7)
		f. Mount bracket (7)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

3-19. TRANSMISSION MAINTENANCE (cont)

b. Transmission Mounts (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
3		Mount bracket (7)	Inspect	Replace if cracked, distorted or worn
4		All other parts	Inspect	Replace if worn, or if threads damaged
INSTALLATION				
5	Engine compartment, front	a. Mount bracket (7)	Position	Against transmission
		b. Four washers (6) and cap screws (5)	Install and tighten	Until bracket (7) is securely mounted
		c. New mount (4)	Install	From top of vehicle frame
		d. Transmission housing	Lower	Lower jack until bracket (7) rests on mount (4)
		e. Cap screw (3), washer (2), and new lock nut (1)	Install and tighten	Until bottom of mount (4) expands to same diameter as washer (2)

NOTE

Repeat preceding steps to replace remaining transmission mount.

3-19. TRANSMISSION MAINTENANCE (cont)

c. *Transmission Removal.*

NOTE

Refer to paragraph 3-5d for separation of transmission from engine.

d. *Control Valve and Modulation Valve Assemblies.*

This task covers:
a. Removal
b. Installation

INITIAL SETUP

TOOLS

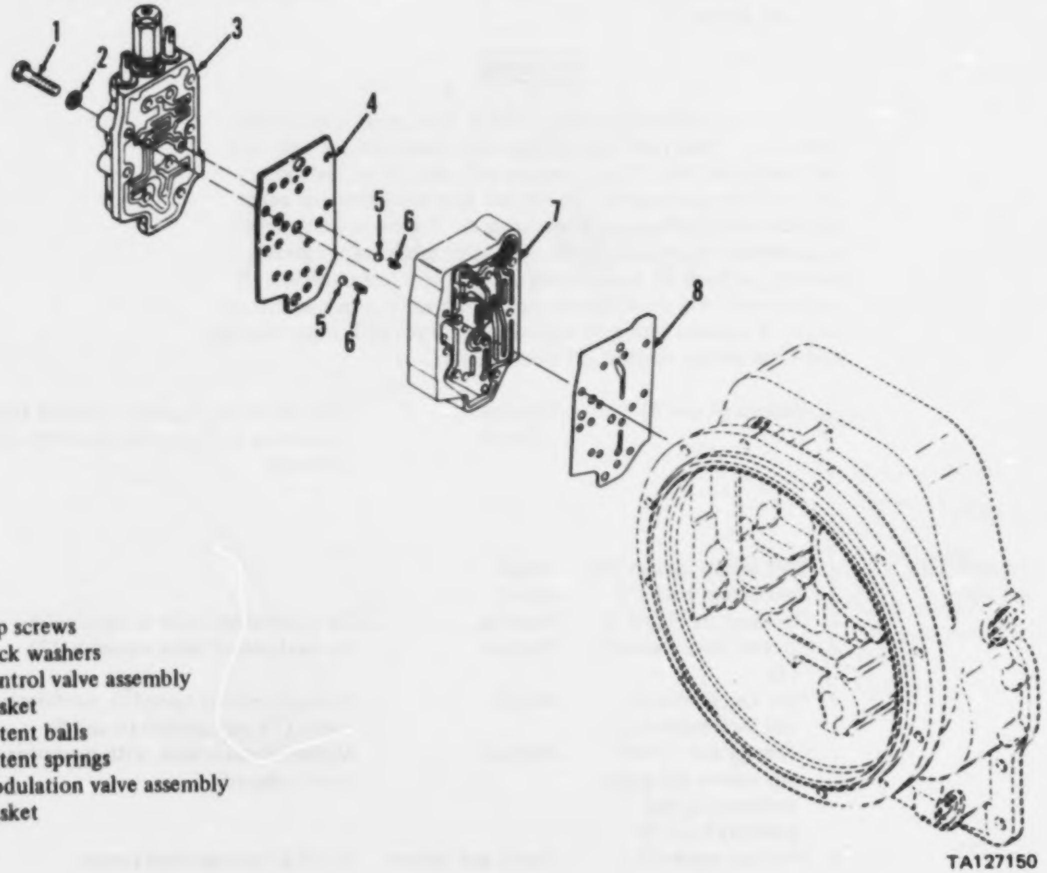
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Gaskets
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off and parking brake applied.
2-53c	Left side panel removed.
2-38b	Control valve linkage disconnected.



KEY

1. Cap screws
2. Lock washers
3. Control valve assembly
4. Gasket
5. Detent balls
6. Detent springs
7. Modulation valve assembly
8. Gasket

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3-19. TRANSMISSION MAINTENANCE (cont)

d. Control Valve and Modulation Valve Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission, left side	a. Nine cap screws (1) and lock washers (2)	Remove	Support control valve (3) and modulation valve (7)
		CAUTION When performing following step, be careful not to lose detent balls (5) or springs (6).		
		b. Control valve (3) and modulation valve (7)	Remove	
		c. Two detent balls (5) and springs (6)	Remove	From control valve assembly (3)
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
		d. Gaskets (4 and 8)	Remove and discard	Clean all traces of gasket material from mounting surfaces with cleaning solvent P-D-680
INSTALLATION				
2	Transmission, left side	a. Two detent springs (6)	Install	
		b. Two detent balls (5)	Install	
		c. New gaskets (4 and 8)	Position	On modulation valve assembly (7)
		d. Control valve assembly (3)	Position	On modulation valve assembly (7)
		e. Nine cap screws (1) and lock washers (2)	Install	Through control valve (3), modulation valve (7), and gaskets (4 and 8)
		f. Valves (3 and 7) with cap screws (1), lock washers (2), and gaskets (4 and 8)	Position	Against transmission, with mounting holes aligned
		g. Nine cap screws (1)	Install and tighten	To 23-25 pounds foot torque

3-19. TRANSMISSION MAINTENANCE (cont)

e. Charging Pump Assembly.

This task covers: a. Removal
b. Installation

INITIAL SETUP

TOOLS

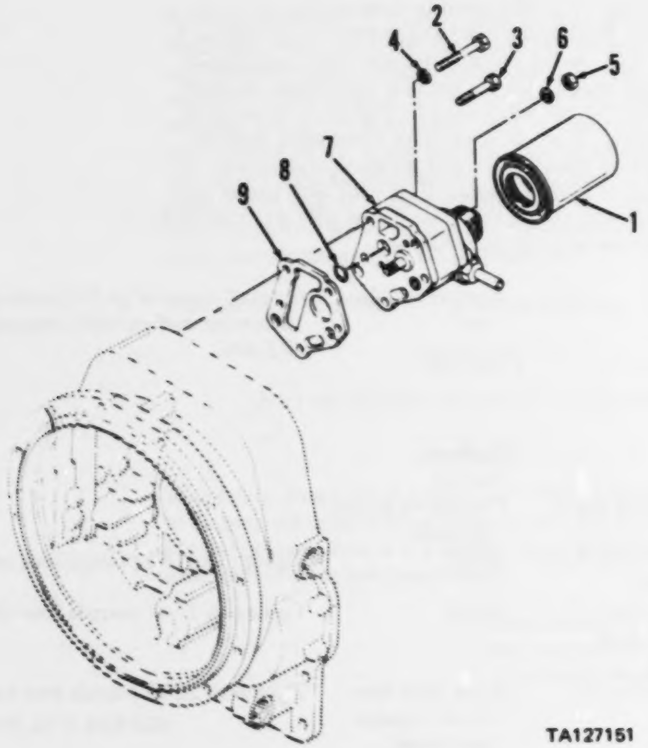
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Clamping Type Filter Wrench	
Container, 4 gallon capacity	

EQUIPMENT CONDITION

Paragraph	Equipment Condition
	Vehicle parked on level surface, engine off and parking brake applied.
2-53c	Left side panel removed.

MATERIALS/PARTS

Filter assembly
O-ring
Gasket
Cleaning solvent P-D-680
Clean cloths



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KEY

1. Filter assembly
2. Cap screw
3. Cap screws
4. Lock washer
5. Nuts
6. Lock washers
7. Charging pump assembly
8. O-ring
9. Gasket

3-19. TRANSMISSION MAINTENANCE (cont)

e. Charging Pump Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Transmission, rear	a. Filter assembly (1)	Loosen and remove	Place 4 gallon capacity container under filter assembly to catch hydraulic oil
		b. Cap screw (2) and lock washer (4)	Remove	
		c. Two cap screws (3), nuts (5), and lock washers (6)	Remove	
		d. Charging pump assembly (7)	Remove	
		e. O-ring (8)	Remove and discard	

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Gasket (9)	Remove and discard	Clean all traces of gasket material from mounting surface with cleaning solvent P-D-680
INSTALLATION				
2	Transmission, rear	a. Gasket (9)	Position	
		b. O-ring (8)	Position	
		c. Charging pump assembly (7)	Position on mounting studs	
		d. Two nuts (5) and lock washers (6)	Install	Tighten to 41-45 pounds foot torque
		e. Three cap screws (2 and 3) and lock washer (4)	Install	Tighten to 37-41 pounds foot torque
		f. Filter assembly (1)	Apply light film of oil to gasket then install	Tighten to 20-25 pounds foot torque

3-19. TRANSMISSION MAINTENANCE (cont)

f. Transmission Oil Cooler.

This task covers:
a. Cleaning
b. Inspection and Repair

INITIAL SETUP

TOOLS
Shop Equipment, Welding NSN 3740-00-357-7268

MATERIALS/PARTS
Clean hydraulic oil (refer to current lubrication order)
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
2-38g	Transmission oil cooler removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
1		Transmission oil cooler	a. Clean exterior	Use cleaning solvent P-D-680
		CAUTION Don't use flushing compounds in following step.		
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
			b. Clean interior by back flushing with clean hydraulic oil and compressed air until all foreign material removed; then steam clean interior	
INSPECTION AND REPAIR				
2		Transmission oil cooler	Inspect for broken welds and brazed joints. Repair by welding and brazing broken joints. If not feasible to repair, replace transmission oil cooler	

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE

a. Front Axle Assembly.

This task covers: a. Removal
b. Installation/Replacement

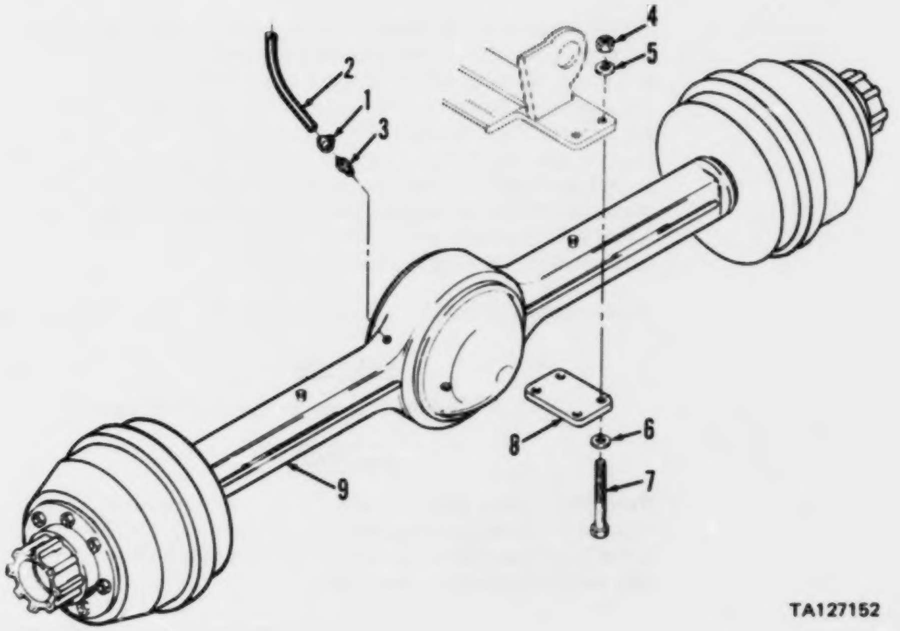
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Jack Stands, 4 ton capacity (2)
Chain Hoist, 10 ton capacity
Roller Jack, one ton capacity
Hard Wooden Block (2), 6 by 6 by 18 inches

MATERIALS/PARTS
Hose (FSCM 81343 P/N SAE30R2TYPE1-1-4ID)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, rear wheels blocked, and parking brake applied.
2-4b(1)	Shipping lock pin installed.
2-39a	Front drive shaft assembly disconnected from front axle assembly differential companion yoke.
	Front chassis raised (use chain hoist) and securely blocked (use jack stands).
2-47	Front wheels and tires removed.
2-43b	Brake hoses, lines and fittings disconnected from front axle assembly housing and wheel cylinders.



KEY

1. Clamp
2. Vent hose
3. Connector
4. Nuts
5. Washers
6. Washers
7. Cap screws
8. Axle support plates
9. Front axle assembly

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3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

a. Front Axle Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Axle housing	a. Roller jack	Position under axle assembly	
		b. Clamp (1)	Loosen	
		c. Vent hose (2)	Disconnect	
		d. Connector (3)	Remove; plug port in axle housing	
2	Bottom front of vehicle	a. Eight nuts (4), washers (5 and 6), and cap screws (7)	Remove	
		b. Two axle support plates (8)	Remove	
		c. Front axle assembly (9)	Lower roller jack, move out of position and remove to work area	
INSTALLATION/REPLACEMENT				
3	Bottom front of vehicle	a. Front axle assembly (9)	Using roller jack, move into position and raise	
		b. Two axle support plates (8)	Position	
		c. Eight cap screws (7), washers (6 and 5), and nuts (4)	Install	
4	Axle housing	a. Connector (3)	Install	
		b. Clamp (1)	Position	On vent hose (2)
		c. Vent hose (2)	Connect to connector	If necessary, make hose from FSCM 81343 P/N SAE30R2type1-1-4ID; cut to 27 inches long
		d. Clamp (1)	Tighten	
		e. Axle assembly fill plug	Check lubricant level and add if necessary	Para 2-39d, step 4

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

b. Rear Axle Assembly.

This task covers: a. Removal
b. Installation

INITIAL SETUP

TOOLS

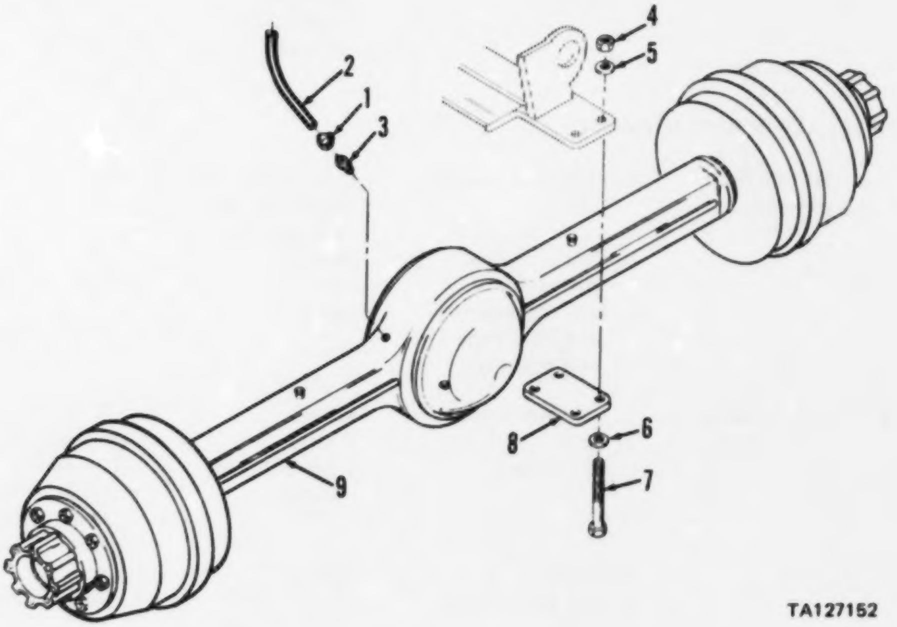
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Jack Stands, 4 ton capacity (2)
Chain Hoist, 10 ton capacity
Roller Jack, one ton capacity
Hard Wooden Blocks (2), 6 by 6 by 18 inches

MATERIALS/PARTS

Hose (FSCM 81343 P/N SAE30R2TYPE1-1-4ID)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, front wheels blocked, and parking brake applied.
2-4b(1)	Shipping lock pin installed.
2-39c	Rear drive shaft assembly disconnected from rear axle assembly differential companion yoke.
	Rear chassis raised (use chain hoist) and securely blocked (use jack stands).
2-47	Rear wheels and tires removed.
2-43b	Brake hoses, lines and fittings disconnected from rear axle assembly housing and wheel cylinders.



KEY

1. Clamp
2. Vent hose
3. Connector
4. Nuts
5. Washers
6. Washers
7. Cap screws
8. Axle support plates
9. Rear axle assembly

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

b. Rear Axle Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Axle housing	a. Roller jack	Position under axle assembly	
		b. Clamp (1)	Loosen	
		c. Vent hose (2)	Disconnect	
		d. Connector (3)	Remove	
2	Bottom rear of vehicle	a. Eight nuts (4), washers (5 and 6), and cap screws (7)	Remove	
		b. Two axle support plates (8)	Remove	
		c. Rear axle assembly (9)	Lower roller jack, move out of position and remove to work area	
INSTALLATION				
3	Bottom rear of vehicle	a. Rear axle assembly (9)	Using roller jack, move into position and raise	
		b. Two axle support plates (8)	Position	
		c. Eight cap screws (7), washers (6 and 5), and nuts (4)	Install	
4	Axle housing	a. Connector (3)	Install	
		b. Clamp (1)	Position	On vent hose (2)
		c. Vent hose (2)	Connect to connector (3)	If necessary, make hose from FSCM 81343 P/N SAE30R2TYPE1-1-4ID; cut to 32 inches long
		d. Clamp (1)	Tighten	
		e. Axle assembly fill plug	Check lubricant level and add if necessary	Para 2-39d, step 4

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

c. *Front Axle Differential Carrier Assembly.*

This task covers:
a. Removal
b. Axle housing cleaning
c. Axle housing inspection
d. Installation

INITIAL SETUP

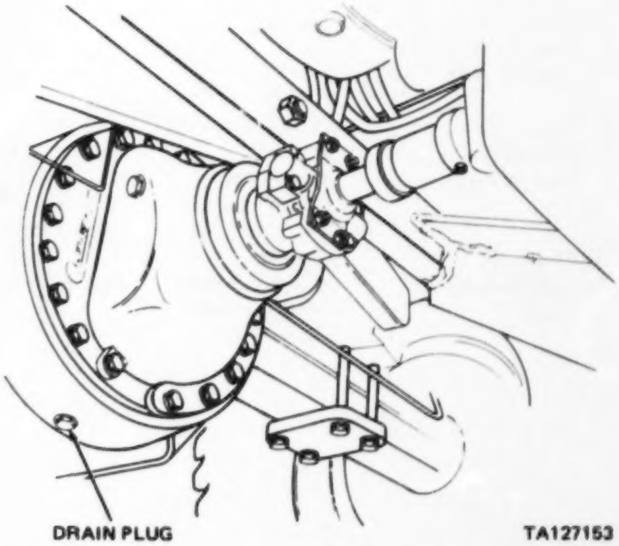
TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Roller Jack, 1/4 ton capacity
Jack Stands, 4 ton capacity
Container, 4 gallon capacity
Hard Wooden Blocks (2), 6 by 6 by 18 inches

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Sealer (FSCM 78500 P/N 1199Q2981)
Moisture free compressed air
Crocus cloth

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, wheels blocked, and parking brake applied.
2-4b(1)	Shipping lock pin installed.
2-39a	Front drive shaft assembly disconnected from front axle assembly differential companion yoke.
2-43b, step 5	Brake line removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Axle housing, bottom	a. Container	Place under drain plug	Drain lubricant into 4 gallon container
		b. Drain plug	Remove and drain lubricant	

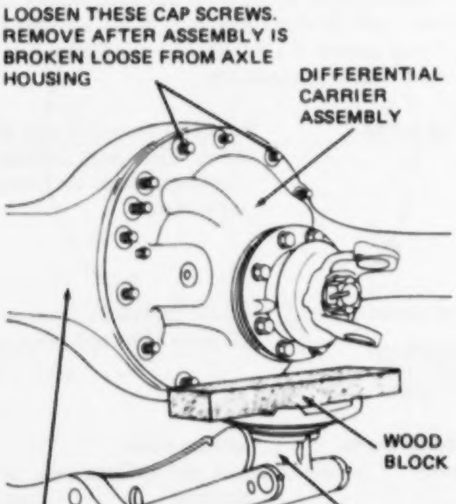


STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Container	Remove	Discard lubricant

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

c. *Front Axle Differential Carrier Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2	Side of vehicle	Two axle shafts	Remove	Para 2-39f, step 1b and 1c
3	Axle housing, bottom	a. Roller jack	Position as shown	
		b. Two cap screws	Loosen cap screws shown	Prevents assembly from falling after remaining cap screws are removed and assembly broken loose from housing
		c. 14 cap screws and washers	Remove	
		d. Differential carrier assembly	Loosen by striking with rawhide mallet	
		e. Two cap screws and washers	Remove	


LOOSEN THESE CAP SCREWS. REMOVE AFTER ASSEMBLY IS BROKEN LOOSE FROM AXLE HOUSING
DIFFERENTIAL CARRIER ASSEMBLY
WOOD BLOCK
AXLE HOUSING
ROLLER JACK
TA127154

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Differential carrier assembly	Remove to clean work area	Use small pinch bar with rounded end to straighten assembly in housing bore

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

c. Front Axle Differential Carrier Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
AXLE HOUSING CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

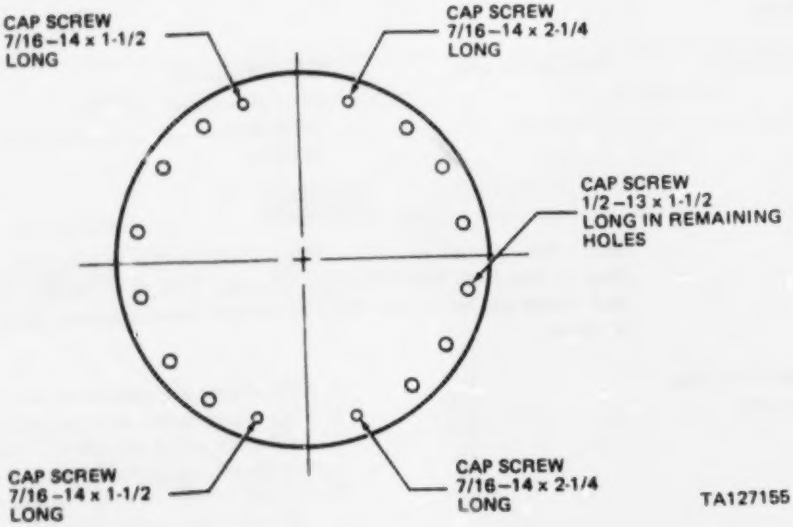
Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4	Axle housing	Differential carrier bore	Remove accumulation of dirt, grit, or gum from axle housing bowl. Clean with cleaning solvent P-D-680; dry with moisture free compressed air. Remove all traces of sealer from mounting surface	
AXLE HOUSING INSPECTION				
5	Axle housing	Differential carrier bore	Inspect for cracks, nicks and burrs at machined surface. Remove nicks and burrs with soft stone or crocus cloth	
INSTALLATION				
6	Axle housing, differential bore	a. Differential carrier assembly	Place on roller jack and roll into position	
		b. Housing bore	Apply sealer around mounting surface	
		c. Differential carrier assembly	Position in housing bore	

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

c. *Front Axle Differential Carrier Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
6 (cont)		**NOTE** Be sure you install correct size cap screw in mounting hole as shown in illustration in following step.		
		d. Four cap screws and washers	Install equally spaced and tighten alternately to draw assembly into housing bore	


CAP SCREW 7/16–14 x 1-1/2 LONG
CAP SCREW 7/16–14 x 2-1/4 LONG
CAP SCREW 1/2–13 x 1-1/2 LONG IN REMAINING HOLES
CAP SCREW 7/16–14 x 1-1/2 LONG
CAP SCREW 7/16–14 x 2-1/4 LONG
TA127155

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. 12 cap screws and washers	Install as shown	
		NOTE Tighten 7/16-14 cap screws to 70-80 pounds foot torque; tighten 1/2-13 cap screws to 110-130 pounds foot torque.		
		f. Roller jack	Remove from under axle housing	
		g. Drain plug	Install	

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

c. *Front Axle Differential Carrier Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
7	Side of vehicle	Two axle shafts	Install	Para 2-39f, steps 12i and 12j
8	Axle assembly	Differential carrier assembly	Fill with lubricant	Para 2-39d, steps 2 and 4
9	Differential carrier assembly	Front drive shaft assembly	Connect to differential companion yoke	Para 2-39a, step 12
10	Transmission rear output flange	Rear drive shaft assembly	Disconnect	Para 2-39c, step 1
11	Front axle	Tires and wheels	Raise off ground, place jack stands under axle housing	

WARNING

Don't allow anyone to stand in front of vehicle during following step; be sure front axle is securely blocked. Vehicle could slip off jack stands and hit anyone standing in front causing serious injury or death.

STEP	LOCATION	ITEM	ACTION	REMARKS
12	Operator's compartment		a. Start engine and operate at idle speed b. Place transmission direction selector in F (forward) position and place speed selector in 3 (third) position c. Disengage parking brake and operate vehicle for five minutes at full throttle to assure satisfactory lubrication of differential carrier assembly parts d. Turn engine off and apply parking brake	
13	Front axle	Tires and wheels	Remove jack stands; lower to ground	
14	Transmission rear output flange	Rear drive shaft assembly	Connect	Para 2-39c, step 10

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

d. *Rear Axle Differential Carrier Assembly.*

This task covers:
- a. Removal
- b. Axle housing cleaning
- c. Axle housing inspection
- d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Roller Jack, 1/4 ton capacity	
Jack Stands, 4 ton capacity	
Container, 4 gallon capacity	
Hard Wooden Blocks (2), 6 by 6 by 18 inches	

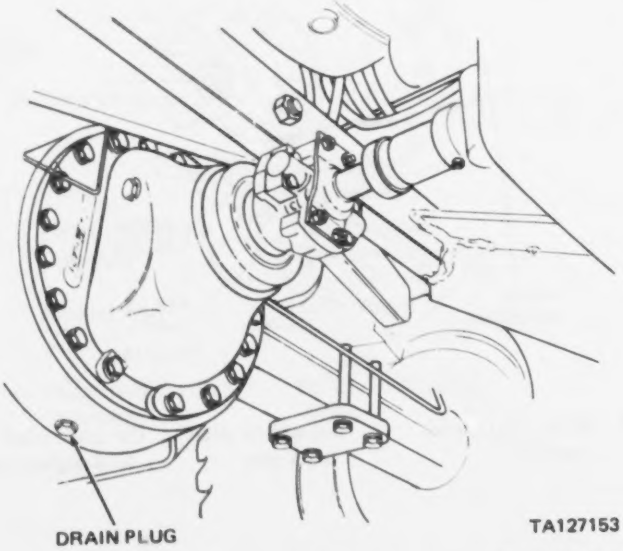
MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Sealer (FSCM 78500 P/N 1199Q2981)
Moisture free compressed air
Crocus cloth

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, wheels blocked, and parking brake applied.
2-4b(1)	Shipping lock pin installed.
2-39c	Rear drive shaft assembly disconnected from rear axle assembly differential companion yoke.
2-43b, step 6	Brake line removed.
3-20b	Rear axle assembly mounting hardware removed and rear chassis raised 12 inches above rear axle assembly and blocked.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Axle housing, bottom	a. Container	Place under drain plug	Drain lubricant into 4 gallon container
		b. Drain plug	Remove and drain lubricant	

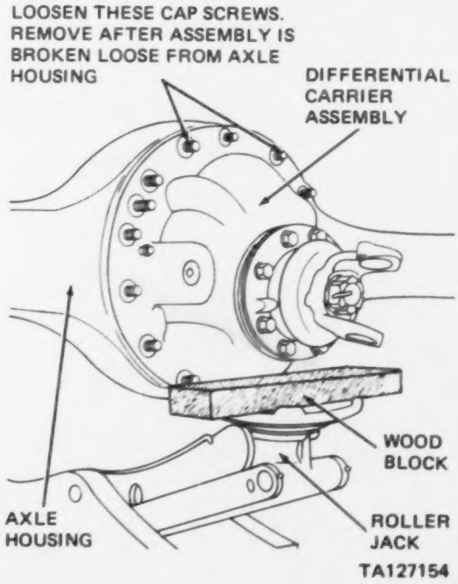


STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Container	Remove	Discard lubricant

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

d. Rear Axle Differential Carrier Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
2	Side of vehicle	Two axle shafts	Remove	Para 2-39f, steps 1b and 1c
3	Axle housing, bottom	a. Roller jack	Position as shown	
		b. Two cap screws	Loosen cap screws shown	Prevents assembly from falling after remaining cap screws are removed and assembly broken loose from housing
		c. 14 cap screws and washers	Remove	
		d. Differential carrier assembly	Loosen by striking with rawhide mallet	
		e. Two cap screws and washers	Remove	
		f. Differential carrier assembly	Remove to clean work area	Use small pinch bar with rounded end to straighten assembly in housing bore


LOOSEN THESE CAP SCREWS. REMOVE AFTER ASSEMBLY IS BROKEN LOOSE FROM AXLE HOUSING
DIFFERENTIAL CARRIER ASSEMBLY
WOOD BLOCK
AXLE HOUSING
ROLLER JACK
TA127154

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

d. Rear Axle Differential Carrier Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
AXLE HOUSING CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

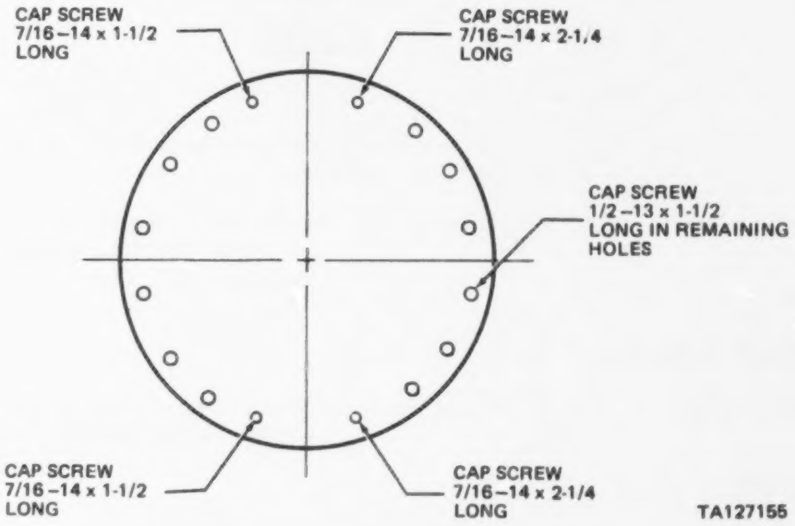
WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4	Axle housing	Differential carrier bore	Remove accumulation of dirt, grit, or gum from axle housing bowl. Clean with cleaning solvent P-D-680; dry with moisture free compressed air. Remove all traces of sealer from mounting surface	
AXLE HOUSING INSPECTION				
5	Axle housing	Differential carrier bore	Inspect for cracks, nicks and burrs at machined surface. Remove nicks and burrs with soft stone or crocus cloth	
INSTALLATION				
6	Axle housing, differential bore	a. Differential carrier assembly	Place on roller jack and roll into position	
		b. Housing bore	Apply sealer around mounting surface	
		c. Differential carrier assembly	Position in housing bore	

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

d. Rear Axle Differential Carrier Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
6 (cont)		**NOTE** Be sure you install correct size cap screw in mounting hole as shown in illustration in following step.		
		d. Four cap screws and washers	Install equally spaced and tighten alternately to draw assembly into housing bore	
		 CAP SCREW 7/16–14 x 1-1/2 LONG CAP SCREW 7/16–14 x 2-1/4 LONG CAP SCREW 1/2–13 x 1-1/2 LONG IN REMAINING HOLES CAP SCREW 7/16–14 x 1-1/2 LONG CAP SCREW 7/16–14 x 2-1/4 LONG TA127155		
		e. 12 cap screws and washers	Install as shown	
		NOTE Tighten 7/16-14 cap screws to 70-80 pounds foot torque; tighten 1/2-13 cap screws to 110-130 pounds foot torque.		
		f. Roller jack	Remove from under axle housing	
		g. Drain plug	Install	

3-20. AXLES AND DIFFERENTIAL CARRIER ASSEMBLIES MAINTENANCE (cont)

d. Rear Axle Differential Carrier Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
7	Side of vehicle	Two axle shafts	Install	Para 2-39f, steps 12i and 12j
8	Axle assembly	Differential carrier assembly	Fill with lubricant	Para 2-39d, steps 2 and 4
9	Differential carrier assembly	Rear drive shaft assembly	Connect to differential companion yoke	Para 2-39c, step 9
10	Transmission parking brake flange	Center drive shaft assembly	Disconnect	Para 2-39b, step 1
11	Rear axle	Tires and wheels	Raise off ground, place jack stands under axle housing	
		WARNING Don't allow anyone to stand in front of vehicle during following step; be sure front axle is securely blocked. Vehicle could slip off jack stands and hit personnel standing in front causing serious injury or death.		
12	Operator's compartment		a. Start engine and operate at idle speed b. Place transmission direction selector in F (forward) position and place speed selector in 3 (third) position c. Disengage parking brake and operate vehicle for five minutes at full throttle to assure satisfactory lubrication of differential carrier assembly parts d. Turn engine off and apply parking brake	
13	Rear axle	Tires and wheels	Remove jack stands; lower to ground	
14	Transmission parking brake flange	Center drive shaft assembly	Connect	Para 2-39b, step 10

Section IV. STEERING SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the:
- Steering wheel and column
- Steering gear
- Hydraulic pump
- Steering cylinder assemblies

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of direct support maintenance.

Para
Troubleshooting Symptom Index 3-21
Hydraulic Pump Troubleshooting 3-22
Steering Column and Cylinder
  Troubleshooting 3-23
Para
Steering System Maintenance 3-24
  Steering Wheel and Column 3-24a
  Steering Gear 3-24b
  Hydraulic Pump Repair 3-24c
  Steering Cylinder Assembly Repair 3-24d

3-21. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
HYDRAULIC PUMP		
Vehicle will not turn when steering wheel is turned	3-22/1	3-152
Hydraulic oil foaming	3-22/2	3-153
Excessive hydraulic pump noise	3-22/3	3-153
STEERING COLUMN AND CYLINDER		
Effort to turn in one direction is more than required in other direction	3-23/1	3-154
Steering wheel turns hard in both directions	3-23/2	3-154

3-22. HYDRAULIC PUMP TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. VEHICLE WILL NOT TURN WHEN STEERING WHEEL IS TURNED

Step 1. Check that steering bypass valve is closed (extreme clockwise position) and hydraulic reservoir is filled with oil (refer to current lubrication order).
Start engine and run at full throttle while operating lift and tilt control levers.
Check that mast assembly operates normally when levers are actuated; then stop engine.

a. If mast assembly does not operate normally, proceed to step 2.

b. If mast assembly operates normally, proceed to MALFUNCTION 2, HYDRAULIC OIL FOAMING.

3-22. HYDRAULIC PUMP TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. VEHICLE WILL NOT TURN WHEN STEERING WHEEL IS TURNED (cont)

Step 2. Check setting of hydraulic relief valve (para 2-48b(2), step 20).

a. If pressure indication is 2500 to 2550 PSI, proceed to MALFUNCTION 2, HYDRAULIC OIL FOAMING

b. If pressure indication is not 2500 to 2550 PSI, adjust relief valve (para 2-48b(2), step 23). If adjusting relief valve does not change pressure indication, replace relief valve (para 2-48b(2)). If adjusting relief valve changes pressure indication, but will not adjust to 2500 to 2550 PSI, repair hydraulic pump (para 3-24c).

2. HYDRAULIC OIL FOAMING

Check for air leakage in suction hose, clamps and fittings to hydraulic pump.

a. If air is leaking into suction hose, tighten clamps or replace fittings or hose (para 2-48b(2)).

b. If air is not leaking into suction hose, proceed to MALFUNCTION 3, EXCESSIVE HYDRAULIC PUMP NOISE.

3. EXCESSIVE HYDRAULIC PUMP NOISE

Step 1. Check for illuminated HYDRAULIC FILTER indicator light.

a. If HYDRAULIC FILTER light is on, replace hydraulic oil filter (para 2-56g(2)). If HYDRAULIC FILTER light remains on after changing oil filter, check for clogged hoses and fittings.

b. If HYDRAULIC FILTER indicator light is not on, proceed to step 2.

Step 2. Check for plugged hydraulic reservoir strainer (para 2-56g(3)).

a. Clean strainer to remove obstructions (para 2-56g(3)).

b. If strainer is clean, and hydraulic pump operation is still noisy, proceed to step 3.

Step 3. Check for plugged suction hose and fittings (para 2-48b(2)).

a. Replace obstructed suction hose and fittings (para 2-48b(2)).

b. If suction hose and fittings are not obstructed, repair hydraulic pump (para 3-24c).

3-23. STEERING COLUMN AND CYLINDER TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. EFFORT TO TURN IN ONE DIRECTION IS MORE THAN REQUIRED IN OTHER DIRECTION

Disconnect horn switch (para 2-32b) to gain access to steering wheel retaining nut.
Park vehicle on dry pavement and center steering wheel.
Start engine and operate at a fast idle.
Using a torque wrench on steering wheel retaining nut, measure and record effort required to turn steering wheel to the right.
Then, center steering wheel and measure and record effort required to turn steering wheel to the left.
The difference between the two torque readings should be less than 2 pound inches.

If the difference between torque readings for left turn and right turn is more than 2 pound inches, steering gear is damaged or has incorrect shims installed. Repair steering gear (para 3-24b).

2. STEERING WHEEL TURNS HARD IN BOTH DIRECTIONS

Step 1. Park vehicle on dry pavement with engine off.
Turn steering wheel in both directions and check for binding or unusual noises at the steering column.

a. If binding or unusual noises are detected, repair steering column (para 3-24a).

b. If steering wheel turns smoothly, without binding or unusual noises, proceed to step 2.

Step 2. Rotate steering wheel until vehicle is fully turned (articulated) to the left.
With engine off, loosen two clamps and slide cylinder guard toward front of vehicle, and disconnect hose from elbow as shown.

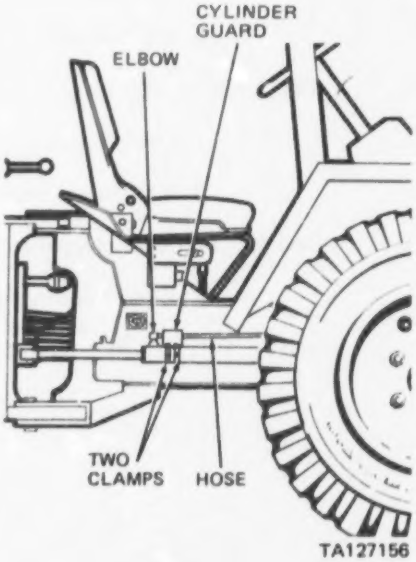
WARNING

Keep hands and feet clear of steering cylinder assembly while checking for leakage. Failure to do so could cause bodily injury.

Start engine and hold steering wheel at the full left turn position.
Check for hydraulic oil leakage from the open steering cylinder elbow, then stop engine.

a. Hydraulic oil coming from open steering cylinder elbow indicates internal steering cylinder leakage. Repair steering cylinder assembly (para 3-24d).

b. If hydraulic oil does not leak from open steering cylinder elbow, proceed to step 3.

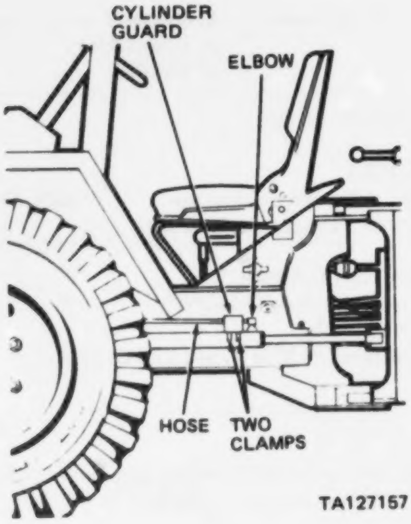


3-23. STEERING COLUMN AND CYLINDER TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. STEERING WHEEL TURNS HARD IN BOTH DIRECTIONS (cont)

Step 3. Rotate steering wheel until vehicle is fully turned (articulated) to the right.
With engine off, loosen two clamps and slide cylinder guard toward front of vehicle, and disconnect hose from elbow as shown.



WARNING

Keep hands and feet clear of steering cylinder assembly while checking for leakage. Failure to do so could cause bodily injury.

Start engine and hold steering wheel at the full right turn position.
Check for hydraulic oil leakage from the open steering cylinder elbow, then stop engine.

a. Hydraulic oil coming from open steering cylinder elbow indicates internal steering cylinder leakage. Repair steering cylinder assembly (para 3-24d).

b. If hydraulic oil does not leak from open steering cylinder elbow, repair steering gear (para 3-24b).

3-24. STEERING SYSTEM MAINTENANCE

a. Steering Wheel and Column.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection/Repair
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS

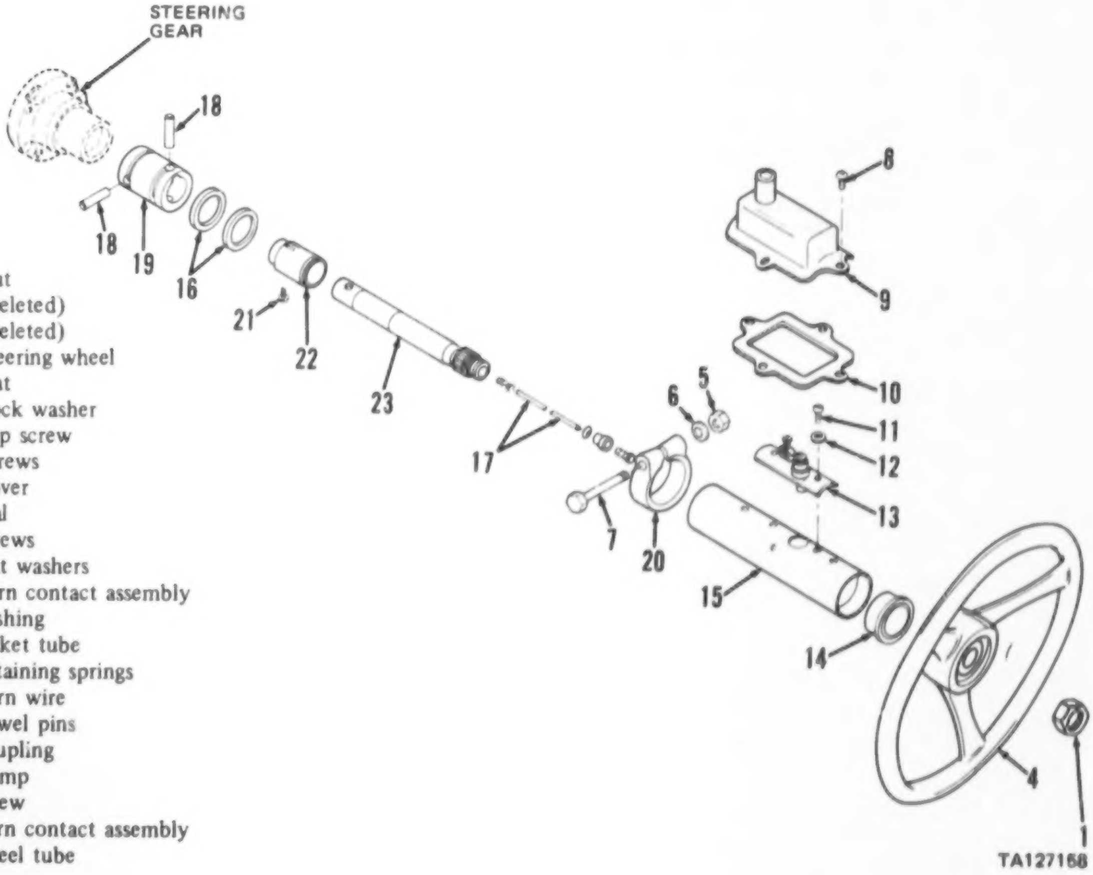
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Lubricant (FSCM 77640 P/N 045096)

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface and engine off.
2-32b	Horn switch removed from steering wheel.



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KEY

1. Nut
2. (Deleted)
3. (Deleted)
4. Steering wheel
5. Nut
6. Lock washer
7. Cap screw
8. Screws
9. Cover
10. Seal
11. Screws
12. Flat washers
13. Horn contact assembly
14. Bushing
15. Jacket tube
16. Retaining springs
17. Horn wire
18. Dowel pins
19. Coupling
20. Clamp
21. Screw
22. Horn contact assembly
23. Wheel tube

3-24. STEERING SYSTEM MAINTENANCE (cont)

a. Steering Wheel and Column (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Steering wheel	a. Nut (1)	Loosen and remove	
		b. Steering wheel (4)	Lift and remove	Use suitable wheel puller if necessary
DISASSEMBLY				
2	Steering column	a. Nut (5), lock washer (6) and cap screw (7)	Loosen and remove	
		b. Four screws (8)	Loosen and remove	
		c. Cover (9) and seal (10)	Remove	Remove all seal residue from cover (9) and jacket tube (15). Discard seal (10)
		d. Two screws (11) and flat washers (12)	Loosen and remove	
		e. Horn contact assembly (13)	Lift and remove	
		f. Jacket tube (15) with bushing (14)	Lift and remove	
		g. Bushing (14)	Remove from jacket tube (15)	If necessary for replacement
		h. Two springs (16)	Lift and remove	
		i. Horn wire (17)	Pull and remove	From top of wheel tube (23)
		CAUTION Do not strike pins (18) with heavy hammer blows in the following step. Heavy hammer blows may damage bearing in steering gear.		
		j. Two dowel pins (18)	Remove and discard	Lightly tap out using 5/16 inch brass rod and hammer
		k. Coupling (19) and wheel tube (23)	Remove and separate	
		l. Clamp (20)	Remove	From upper cover of steering gear
		m. Screw (21)	Loosen and remove	
		n. Horn contact assembly (22)	Pull and remove	From smooth end of wheel tube (23)

3-24. STEERING SYSTEM MAINTENANCE (cont)

a. Steering Wheel and Column (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
3		Cover (9), horn contact assembly (13), bushing (14), horn wire (17) and horn contact assembly (22)	Clean	Wipe with a clean, dry cloth

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION/REPAIR				
5		Horn contact assembly (13 and 22)	Inspect	Replace if cracked, pitted or scored, or if insulating paper cracked, torn or damaged
6		Retaining springs (16)	Inspect	Replace if cracked or distorted
7		Coupling (19) and wheel tube (23)	Inspect	Replace if pitted, scored or worn, or if counterbores for dowel pins (18) elongated. Replace wheel tube (23) if serrations chipped, broken or missing, or if threads damaged
8		Horn wire (17)	Inspect	Replace if insulation frayed, or conductor or terminals broken

3-24. STEERING SYSTEM MAINTENANCE (cont)

a. Steering Wheel and Column (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR (cont)				
9		Nuts (1 and 5) and screws (7, 8, 11 and 21)	Inspect	Replace if worn, or if threads damaged
10		Steering wheel (4)	Inspect	Replace if cracked, or if serrations chipped, broken or missing
11		Jacket tube (15)	Inspect	Replace if cracked, distorted or out-of-round, or if threads damaged
12		Bushing (14)	Inspect	Replace if worn, damaged or deteriorated
13		All other parts	Inspect	Replace if worn or damaged
REASSEMBLY				
14	Steering column	a. Clamp (20)	Position	On upper cover of steering gear
		b. Horn contact assembly (22)	Position	On wheel tube (23)
		c. Horn wire (17)	Install	
		d. Screw (21)	Install and tighten	Until horn contact assembly (22) is securely mounted
		e. Coupling (19)	Position	On wheel tube (23), with slot in coupling aligned with terminal on horn contact assembly (22)
		f. Dowel pin (18)	Install	Use 5/16 inch brass rod. Press or tap in until centered in coupling (19)

NOTE

Perform the following step only if bushing (14) was removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Bushing (14)	Install	Using soft plastic hammer, lightly tap until flush with top of jacket tube (15)
		h. Coupling (19) with wheel tube (23)	Position	On steering gear input shaft

CAUTION

Do not strike dowel pins (18) with heavy hammer blows in the following step. Heavy hammer blows may damage bearing in steering gear.

STEP	LOCATION	ITEM	ACTION	REMARKS
		i. Two dowel pins (18)	Install	Lightly tap in using 5/16 inch brass rod and hammer. Be sure dowel pins are centered in coupling (19)

3-24. STEERING SYSTEM MAINTENANCE (cont)

a. Steering Wheel and Column (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
14 (cont)		j. Two retaining springs (16)	Install	In grooves of coupling (19)
		k. Jacket tube (15) with bushing (14)	Position	Apply lubricant (FSCM 77640, P/N 045096) to inside of bushing. Slide over wheel tube (23), through clamp (20) and onto upper cover of steering gear
		l. Cap screw (7), lock washer (6) and nut (5)	Install and tighten	Tighten to 15-20 pounds foot torque
		m. Horn contact assembly (13)	Position	On jacket tube (15)
		n. Two flat washers (12) and screws (11)	Install and tighten	Until horn contact assembly (13) is securely mounted
		o. Cover (9) and new seal (10)	Position	On jacket tube (15)
		p. Four screws (8)	Install and tighten	Until cover (9) is securely mounted
INSTALLATION/REPLACEMENT				
15	Steering wheel	a. Steering wheel (4)	Position	Slide over horn wire (17) and onto wheel tube serrations
		b. Nut (1)	Install and tighten	Tighten to 10-15 pounds foot torque

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Repair
f. Reassembly
g. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Grease (FSCM 77640 P/N 045113)
4 inch worm drive hose clamp (FSCM 66295 P/N 64H)
Two guide studs, 5/16-18UNC by 3-3/4 inch
Cellophane tape
O-rings
Rotor seal
Back-up washer
Seal
Dirt seal
600 grit abrasive cloth

EQUIPMENT CONDITION

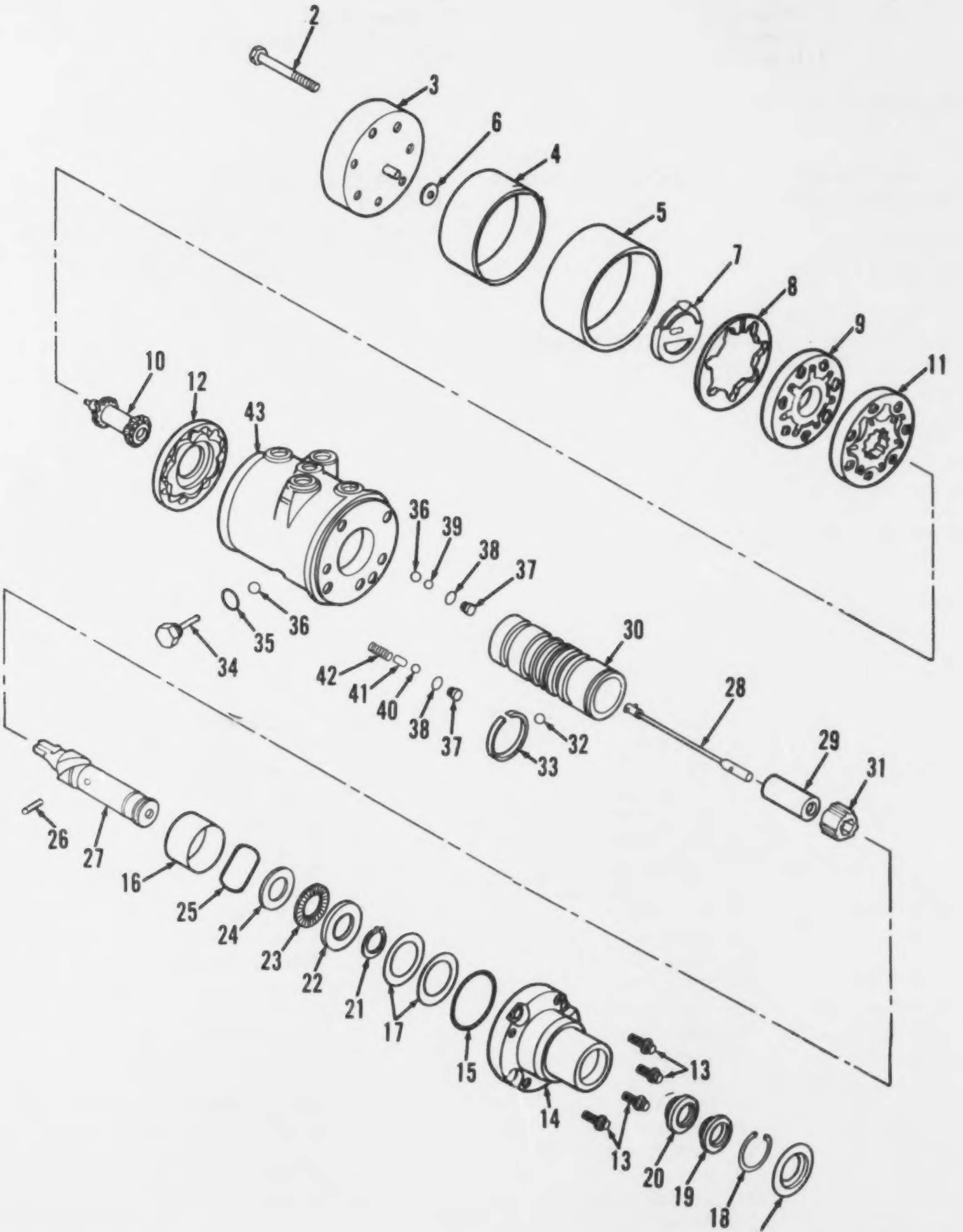
Paragraph	Condition Description
3-24a	Steering wheel and column removed.
2-48b(2)	Hoses and fittings disconnected from steering gear.

KEY

1. Dirt seal
2. Hex bolts
3. End cover
4. Rotor seal
5. Seal retainer
6. Wear washer
7. Commutator
8. Commutator ring
9. Manifold
10. Drive link
11. Rotor set
12. Spacer
13. Cap screws
14. Upper cover
15. O-ring
16. Spacer
17. Shim(s)
18. Retaining ring
19. Back-up washer
20. Seal
21. Retaining ring
22. Thrust washer
23. Thrust bearing
24. Thrust washer
25. Spring washer
26. Needle roller
27. Input shaft
28. Torsion bar
29. Spacer
30. Spool
31. Drive ring
32. Actuator ball
33. Retainer spring
34. Plug
35. O-ring
36. Balls, 1/4 inch
37. Plugs
38. O-rings
39. Ball, 7/32 inch
40. Ball, 9/32 inch
41. Needle roller
42. Spring
43. Housing

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).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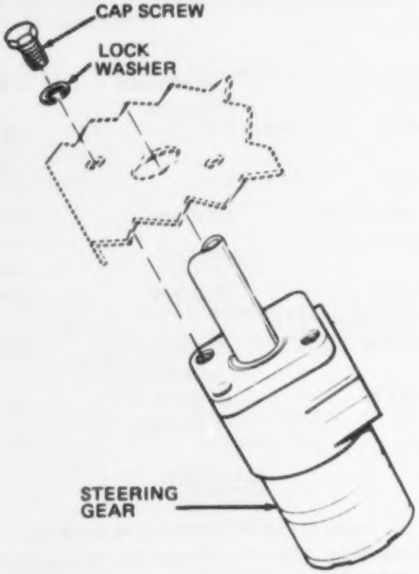
3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Instrument panel center	a. Four cap screws and lock washers b. Steering gear	Loosen and remove Lower and remove	Support steering gear
				
DISASSEMBLY				
2	Steering gear	a. Dirt seal (1)	Remove and discard	
		CAUTION To prevent distortion of steering gear, do not clamp vise jaws directly on steering gear housing (43).		
		b. Steering gear	Position and clamp	Install O-ring tube fitting, with tube nut or fitting cap attached, into one of the four threaded ports in housing (43). Clamp the O-ring fitting in vise so that end cover (3) faces upward

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
2 (cont)		c. Seven hex bolts (2)	Loosen and remove	

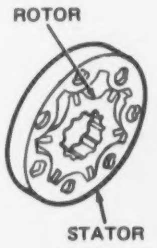
CAUTION

Do not attempt to remove guide pin from inside center of end cover (3). Guide pin is press fit in the end cover and is not serviceable separately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. End cover (3)	Loosen and remove	Lightly tap sides with soft hammer to loosen from rotor seal (4) and seal retainer (5). Washer (6) and commutator (7) may be removed with end cover (3)
3	Housing (43)	a. Rotor seal (4) and seal retainer (5)	Remove	Loosen seal retainer (5) by bumping sideways with a soft hammer, and remove seal (4) and retainer (5). Discard seal (4)
		b. Wear washer (6) and commutator (7)	Remove	From housing (43) or end cover (3)
		c. Commutator ring (8)	Remove from manifold (9)	Remove with a sliding and lifting motion
		d. Manifold (9)	Remove from rotor set (11)	Remove with a sliding and lifting motion

CAUTION

Rotor set (11) requires special attention in handling to avoid nicks and scratching. When handling rotor set, apply pressure to rotor by grasping rotor and urging into contact with stator.



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STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Rotor set (11), spacer (12) and drive link (10)	Remove as an assembly	Grasp spacer (12) and remove assembly with a sliding and lifting motion

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
4	Rotor set (11)	a. Drive link (10)	Remove	Slide rotor set (11) on spacer (12), allowing drive link teeth to clear spacer hole.
		b. Spacer (12)	Separate	From rotor set (11)
		c. Rotor set (11)	Carefully set aside	To protect against damage to side faces of rotor and stator
5	Housing (43)	**CAUTION** To prevent distortion of steering gear, do not clamp vise jaws directly on steering gear housing (43).		
		a. Housing (43)	Reposition and clamp	Clamp O-ring fitting in vise so that input shaft (27) faces upward
		b. Upper cover (14) and housing (43)	Match mark	Use center punch and hammer
		c. Four cap screws (13)	Loosen and remove	Use 5/16 inch 12 point socket
		CAUTION Do not use excessive force to remove spool (30) from housing (43). Avoid applying side forces to input shaft (27) which would cause binding of spool (30).		
		d. Upper cover (14), input shaft (27) and spool (30)	Remove from housing (43)	Grasp input shaft (27) and, with a smooth upward motion, remove as an assembly
		e. O-ring (15)	Remove and discard	
6	Upper cover (14)	a. Input shaft (27)	Remove	
		b. Shims (17)	Remove from cover (14) or face of thrust washer (22)	Retain shims for use at reassembly
		c. Spacer (16)	Remove	
		d. Retaining ring (18)	Remove	Use snap ring pliers
		e. Back-up washer (19) and seal (20)	Remove and discard	
7	Input shaft (27)	a. Retaining ring (21)	Remove	
		b. Thrust washers (22 and 24), bearing (23) and spring washer (25)	Pull and remove	

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
7 (cont)		c. Needle roller (26)	Remove	Place input shaft (27) on a block of wood to prevent damage. Lightly tap out needle roller (26) using 0.120 inch pin punch and hammer
8	Spool (30)	a. Torsion bar (28) and spacer (29)	Remove	Invert spool (30) and catch free falling parts
		NOTE Do not attempt to remove pin from end of torsion bar (28). Pin is press fit in torsion bar and is not serviceable separately.		
		b. Drive ring (31)	Remove	Place end of spool (30) on a table surface, and rotate input shaft (27) to extremes of travel until drive ring (31) falls free
		c. Input shaft (27) and actuator ball (32)	Remove	With end of spool (30) on a table surface, rotate input shaft clockwise until ball (32) disengages from helical groove in shaft. Carefully lift out input shaft and catch actuator ball
		NOTE Remove retainer spring (33) only if required for replacement.		
		d. Retainer spring (33)	Remove from spool (30)	Grasp flattened end of retainer spring with pliers. Carefully pry flattened end over shoulder on spool with pliers and a screwdriver. Continue pulling motion to progressively remove retainer spring, and avoid scratching or nicking spool
9	Housing (43)	**NOTE** In the following steps, exercise care to prevent loss of small parts. If necessary, shake housing (43) to remove balls (36, 39 and 40).		
		a. Plug (34)	Loosen and remove	
		b. O-ring (35)	Remove and discard	
		c. Ball (36)	Remove	
		d. Two plugs (37)	Loosen and remove	

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
9 (cont)		e. Two O-rings (38)	Remove and discard	
		f. Balls (39, 36 and 40)	Remove	
		g. Needle roller (41) and spring (42)	Remove	
CLEANING				

WARNING

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WARNING

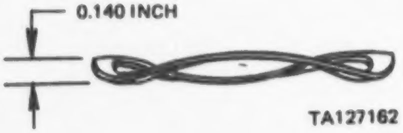
Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
10		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air

NOTE

Do not use cloths to dry internal parts.

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
11		Spring washer (25)	Inspect	Replace if thickness is less than 0.140 inch as shown, or if cracked or distorted



3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
12		Spring (42)	Inspect	Install in spring tester. Check that force to compress spring to 0.830 inch is 12.5 to 14.5 pounds. Replace spring if force is not 12.5 to 14.5 pounds
13		Torsion bar (28) and pin	Inspect	Use micrometer to measure diameter of pin on both sides. Diameter must not vary more than 0.001 inch. Replace torsion bar if scored, bent or worn. or if pin diameter varies more than 0.001 inch
14		Thrust washers (22 and 24), thrust bearing (23), and wear washer (6)	Inspect	Replace if pitted, scored or excessively worn
15		Input shaft (27)	Inspect	Replace if cracked or bent, if seal area is pitted, corroded or worn, or if helical groove is chipped or pitted

NOTE

Light polishing of shaft due to seal contact is normal and is not cause for shaft replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
16		Needle roller (26)	Inspect	Replace if cracked or damaged
17		Balls (32, 36, 39 and 40)	Inspect	Replace if pitted, scored, out-of-round or damaged
18		Retaining rings (18 and 21) and spring (33)	Inspect	Replace if cracked or broken
19		Screws (2 and 13) and plugs (34 and 37)	Inspect	Replace if worn, or if threads damaged
20		Drive link (10)	Inspect	Replace if cracked, or if teeth chipped, broken or excessively worn

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
20 (cont)		**NOTE** Spool (30) is not serviced separately. Replace steering gear assembly if spool is defective.		
21		Spool (30)	Inspect	Replace steering gear assembly if splines chipped or broken, or if outside diameter or control edges scored, worn or damaged
22		End cover (3)	Inspect	Replace if pin damaged, or if lapped face nicked, burred, or scored
23		Upper cover (14)	Inspect	Replace if cracked or broken, or if end nicked or burred
24		Drive ring (31)	Inspect	Replace if splines chipped or damaged
		NOTE Housing (43) is not serviced separately. Replace steering gear assembly if housing is defective.		
25		Housing (43)	Inspect	Replace steering gear assembly if threads damaged, or if bore or ends nicked, burred or scored
		NOTE Replace commutator (7) and commutator ring (8) as a matched set. Commutator and ring are not serviced separately.		
26		Commutator (7) and commutator ring (8)	Inspect	Measure side clearance between commutator and ring. Replace commutator and ring if either is scored, pitted or burred, or if side clearance is more than 0.0015 inch
27		Manifold (9) and spacer (12)	Inspect	Replace if nicked, burred or scored

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
28		Rotor set (11)	Inspect	Inspect lobes and faces of rotor and stator for scratches, burrs and scoring. Inspect splines in rotor for chipping, damage or excessive wear. Use micrometer to measure thickness (face-to-face) of rotor and stator. Replace rotor set (11) if lobes, faces or splines damaged, or if thickness difference between rotor and stator is more than 0.002 inch
29		Rotor set (11)	Check clearance	Place rotor set face down on the lapped face of the end cover (3). Use a tapered feeler gage to measure clearance between rotor and stator at each lobe. Replace rotor set if clearance is more than 0.007 inch
REPAIR				
30				

NOTE

If abrasive paper is new, it should be rubbed down with a piece of steel to remove sharp grit which would produce scratches.

WARNING

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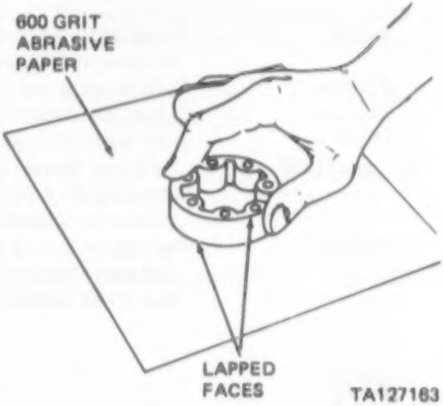
WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

3-24. STEERING SYSTEM MAINTENANCE (cont)

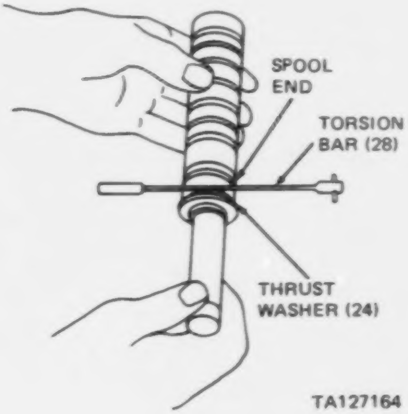
b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REPAIR				
30 (cont)		Upper cover (14), housing (43), commutator ring (8), manifoid (9) and spacer (12)  TA127163	Clean up	Place 600 grit abrasive paper on an extremely flat surface. Hold each part so that contact with abrasive paper is as flat as possible, and lightly stroke 6 to 10 times across paper as shown. Check lapped face of each part for small bright areas which indicate burrs. Replace parts which cannot be cleaned up. After lapped surfaces are clean, wash parts with cleaning solvent P-D-680 and dry thoroughly with moisture free compressed air
REASSEMBLY				
31	Housing (43)	**NOTE** Do not lubricate parts unless instructed to do so.		
		a. Spring (42), needle roller (41), and ball (40)	Position	In cavity of housing (43)
		b. New O-ring (38) and plug (37)	Install and tighten	Until plug (37) is securely mounted
		c. Two steel balls (36 and 39)	Position	In cavity of housing (43)
		d. Plug (37) and new O-ring (38)	Install and tighten	Until plug (37) is securely mounted
		e. Steel ball (36)	Position	In side cavity of housing (43)
		f. Plug (34) and new O-ring (35)	Install and tighten	Tighten to 10-14 pounds foot torque
32	Input shaft (27) and spool (30)	a. Thrust bearing (23) and washers (22 and 24)	Position	On input shaft
		b. Retaining ring (21)	Install	Use snap ring pliers

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)		**NOTE** Perform the following step only if retainer spring (33) has been removed.		
		c. New retainer spring (33)	Install	Carefully insert into groove on spool to avoid scratching or nicking spool
		d. Spring washer (25)	Position	Over thrust washer (24) and bearing (23)
		e. Actuator ball (32)	Position	In ball seat located inside spool (30)
		f. Input shaft (27)	Install in spool (30)	Hold input shaft and spool in a horizontal position. Insert input shaft into spool, engaging the helix and actuator ball with a counter-clockwise motion
		g. Torsion bar (28)	Position	Use mid-section of torsion bar as a gage, and insert torsion bar between spool end and thrust washer (24) as shown



STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Input shaft (27) with spool (30)	Position vertically	Keeping torsion bar between spool end and thrust washer, place shaft and spool in a vertical position, with shaft end on a table surface
		i. Drive ring (31)	Position and install	Position drive ring in end of spool. Visually align an internal space on drive ring with a tooth on input shaft spline, and allow drive ring to drop to limit of its travel. Rotate input shaft slightly to allow drive ring to fully engage

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)		j. Torsion bar (28)	Remove	
		NOTE If new torsion bar (28) is used, check color code on pin end of torsion bar. Do not install unless torsion bar is color coded orange.		
		k. Torsion bar (28) and spacer (29)	Install	Slide spacer (29) over cross-hole end of torsion bar (28); then insert torsion bar cross-hole end into end of spool (30)
		l. Torsion bar (28)	Position	To align cross-hole with cross-hole in the input shaft. Insert a 0.120 inch diameter pin punch into cross-holes to maintain alignment
		m. Needle roller (26)	Install	Insert needle roller into cross-hole in input shaft while withdrawing pin punch. Remove pin punch when needle roller engages cross-hole in torsion bar. Place cross-hole of input shaft over drive hole of a 1/2 inch drive socket. Using a hammer and 0.120 inch diameter pin punch, lightly tap needle roller to approximately 1/32 inch below outside diameter of input shaft.
33	Upper cover (14) and—housing (43)	**CAUTION** To prevent distortion of steering gear, do not clamp vise jaws directly on steering gear housing (43).		
		a. Housing (43)	Position and clamp	Install O-ring tube fitting, with tube nut or fitting cap attached, into one of the four threaded ports in housing (43). Clamp the O-ring fitting in vise so that upper cover end of housing faces upward
		b. Spacer (16)	Position	Over spool (30)
		CAUTION In the following step, avoid applying side forces to the spool (30) which would cause binding and damage.		
		c. Spool (30) with input shaft (27)	Install	Slide spool end into bore of housing (43)

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3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
33 (cont)		**NOTE** Use original shims (17) unless cracked or damaged. Replace a defective shim with a new shim of equal thickness.		
		d. Shims (17)	Install	Place on tip of thrust washer (22)
		e. New O-ring (15)	Lubricate and install	Coat with clean grease and insert in counterbore of upper cover
		NOTE If original upper cover (14) is used, align match marks on upper cover and housing (43). If a new upper cover is used, disregard match mark on housing.		
		f. Upper cover (14)	Position	Over input shaft (27) and onto housing (43)
		g. Four cap screws (13)	Install and tighten	Tighten hand-tight only
		h. Upper cover (14) and housing (43)	Align	Position worm type hose clamp around flange of upper cover (14) and outside diameter pilot of housing (43). Tighten clamp to achieve upper cover and housing alignment
		i. Four cap screws (13)	Tighten	Alternately tighten to 18-22 pounds foot torque
		CAUTION To prevent distortion of steering gear, do not clamp vise jaws directly on steering gear housing (43).		
		j. Housing (43)	Reposition and clamp	Clamp O-ring fitting in vise so that input shaft (27) faces downward
		k. Drive link (10)	Install	Pull input shaft (27) downward and prevent rotation, engage splines on drive link (10) in spool (30), and rotate drive link to position spool end flush with end of housing (43). Remove drive link, reposition to allow drive link slot to engage pin on torsion bar, and insert drive link

3-24. STEERING SYSTEM MAINTENANCE (cont)

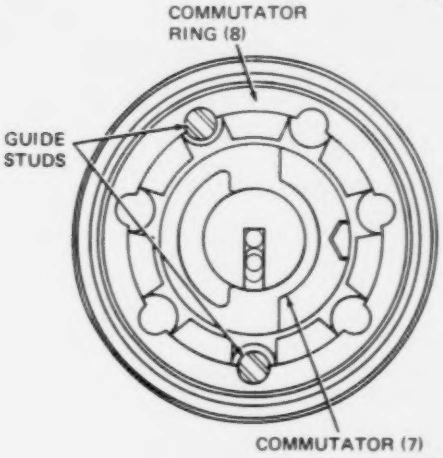
b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
33 (cont)		**NOTE** Perform steps l through q only if input shaft (27) and/or upper cover (14) have been replaced.		
		l. Spool (30)	Measure protrusion	While pulling input shaft (27) downward, measure relationship of spool end to end of housing using feeler gage. (Measure from end nearest outside diameter of spool to end nearest inside diameter of body.) If spool end is within 0.0025 inch of being flush, proceed to step 34. If not within 0.0025 inch of being flush, proceed to step m.
		m. Drive link (10)	Remove	
		n. Housing (43)	Reposition and clamp	Clamp O-ring fitting in vise so that input shaft (27) faces upward
		o. Four cap screws (13)	Loosen and remove	
		p. Upper cover (14) with O-ring (15)	Remove	
		q. Shims (17)	Add or remove	Add or remove shims to satisfy requirement of step l, and repeat steps e through i until spool is flush with end of housing within 0.0025 inch
34	End cover (3) and housing (43)	a. Two 5/16-18UNC by 3-3/4 inch guide studs	Install	In two of seven threaded holes at end of housing (43)
		b. Spacer (12)	Position and install	Position plain side of spacer away from housing (43), and lower spacer over guide studs and onto housing
		NOTE One of the seven holes in the stator of the rotor set (11) is smaller than the other six holes. In the following step, position this smaller hole over one of the guide studs.		
		c. Rotor set (11)	Install	Lower over guide studs and onto spacer (12)
		d. Manifold (9)	Position and install	Position circular slot side of manifold away from housing (43) and lower manifold over guide studs and onto rotor set (11)

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

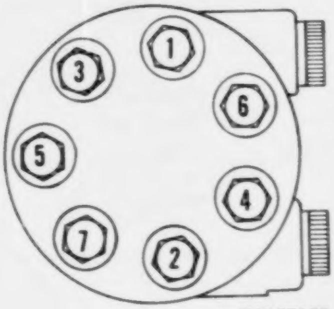
STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
34 (cont)		e. Commutator ring (8)	Position and install	Position slot side of commutator ring toward housing (43), and lower over guide studs and onto manifold (9)
		f. Seal retainer (5) and new rotor seal (4)	Install	Assemble over rotor set (11) and down against housing (43)
		g. Commutator (7)	Position and install	Position counterbore side of commutator away from housing (43), and engage slotted hole in commutator with nose of drive link (10). Center commutator in commutator ring to achieve equal spacing as shown



STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Wear washer (6)	Install	Apply a small amount of grease to one side of washer (6) and place washer over pin on end cover (3). Grease should hold washer in place when end cover is inverted
		i. End cover (3) with wear washer (6)	Position and install	Lower end cover (3) over guide studs and onto commutator ring (8)
		j. Five hex bolts (2)	Install and tighten	Tighten hand-tight only
		k. Two guide studs	Remove	
		l. Two hex bolts (2)	Install and tighten	Tighten hand-tight only

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
34 (cont)		**CAUTION** Tighten seven hex bolts (2) according to steps m and n only. Do not over tighten bolts to avoid damage to steering gear.		
		m. Seven hex bolts (2)	Tighten (initial)	Using 5/16 inch 12 point socket, tighten in sequence shown to initial torque of 2-3 pounds foot
		 TA127166		
		n. Seven hex bolts (2)	Tighten (final)	Using same sequence, tighten to 15-19 pounds foot torque
35	Upper cover (14) and input shaft (27)	a. Housing (43)	Reposition and clamp	Clamp O-ring fitting in vise so that input shaft (27) faces upward
		NOTE Cover end of input shaft (27) with cellophane tape to protect new seal (20) from sharp edges of shaft.		
		b. New seal (20)	Lubricate and install	Coat seal with grease and install over input shaft lip side first
		c. New back-up washer (19)	Install	Position small end toward input shaft; then slide onto shaft and against seal (20)
		d. Seal (20) and back-up washer (19)	Position	Using a 7/8 inch deep well socket, gently push back-up washer and seal down into upper cover (14)
		e. Retaining ring (18)	Install	Position rounded edge of retaining ring toward upper cover. Slide retaining ring over input shaft, and install in groove in upper cover using snap ring pliers

3-24. STEERING SYSTEM MAINTENANCE (cont)

b. Steering Gear (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
35 (cont)		f. New dirt seal (1)	Install	In counterbore of upper cover (14)

NOTE

If steering gear is to be stored, plug two cylinder ports and fill inlet port with clean hydraulic oil (refer to current lubrication order). Rotate input shaft (27) until hydraulic oil appears at outlet port, and plug inlet and outlet port.

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
36	Instrument panel center	a. Steering gear	Position	From bottom of instrument panel
		b. Four cap screws and lock washers	Install and tighten	Until steering gear is securely mounted

NOTE

Remove O-ring tube fitting or plugs from cylinder, inlet, or outlet ports as necessary.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Hoses and fittings	Reconnect	Para 2-48b(2)
		d. Steering column and wheel	Install	Para 3-24a

NOTE

If input shaft (27) and/or upper cover (14) have been replaced, check difference in torque required for left turn and right turn (para 3-22, MALFUNCTION 3). If torque difference is more than 2 pound inches, remove steering gear and add or remove shims. (Add shims to increase effort in left turn. Remove shims to increase steering effort in right turn).

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair.

This task covers: a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

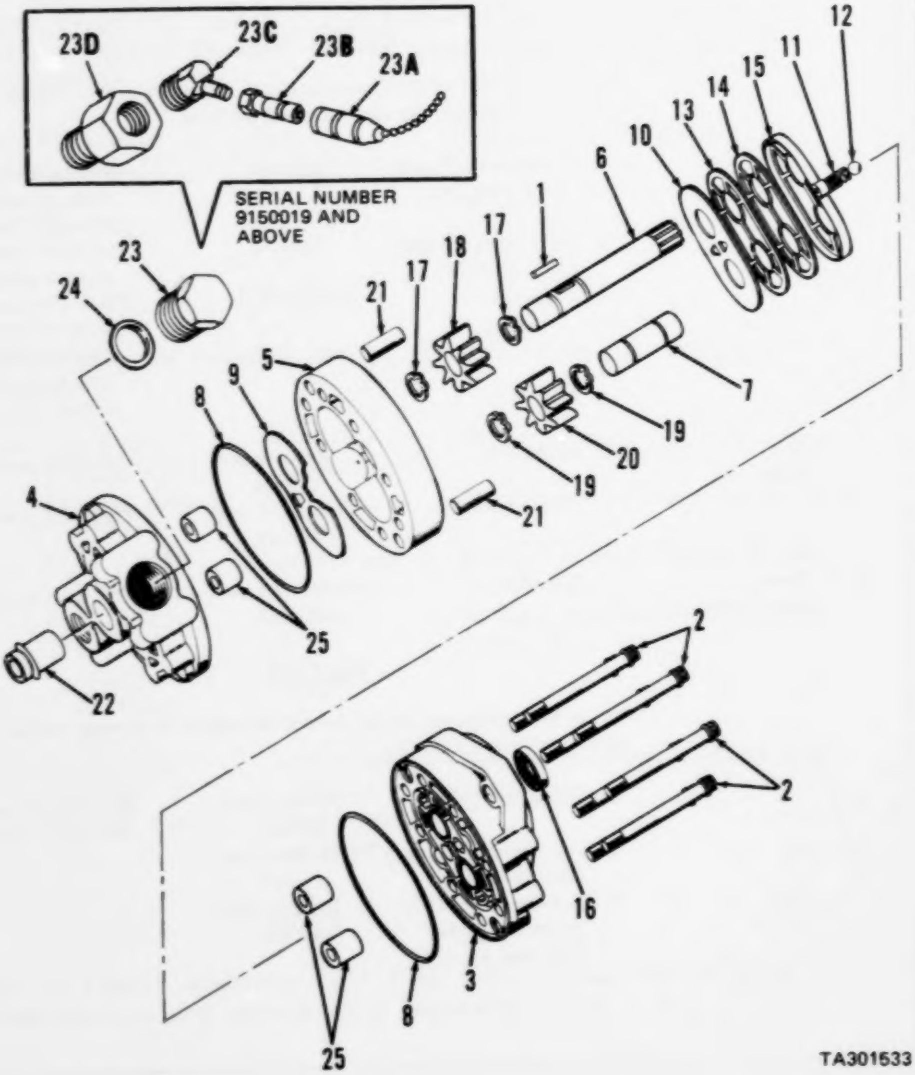
INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
5 inch micrometer
1-15/16 inch seal driver

EQUIPMENT CONDITION

Paragraph	Condition Description
2-48a	Hydraulic pump removed.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Seal repair kit (FSCM 27007 P/N 24500-930)
Cellophane tape


23D
23C
23B
23A
SERIAL NUMBER 9150019 AND ABOVE
12
11
15
14
13
10
6
1
17
18
17
21
23
24
5
9
8
7
19
20
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25
22
2
2
16
3
8
25
TA301533

KEY

1. Key
2. Cap screws
3. Front plate
4. Back plate
5. Body
6. Drive shaft
7. Idler shaft
8. O-rings
9. Thrust plate
10. Diaphragm
11. Springs
12. Balls
13. Back-up gasket
14. Protector gasket
15. Seal
16. Shaft seal
17. Retaining rings
18. Drive gear
19. Retaining rings
20. Idler gear
21. Dowel pins
22. Intake tube
23. Plug

23A. Cap
23B. Coupler
23C. Fitting
23D. Connector

24. O-ring
25. Bushings

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Hydraulic pump	a. Hydraulic pump	Position and clamp	In vise, with drive shaft (6) facing up
		b. Back plate (4), body (5) and front plate (3)	Match mark	Use center punch and hammer
		c. Eight cap screws (2)	Loosen and remove	
		d. Hydraulic pump	Remove	From vise
		CAUTION Do not attempt to pry front plate and back plate apart. Prying sections apart will damage machined surfaces.		
		e. Front plate (3) and back plate (4)	Separate	Holding pump in both hands, bump drive shaft (6) against a wooden block to separate front and back plate
		f. Drive shaft (6) and idler shaft (7)	Remove	Pull from bushing (25) in front plate (3) or back plate (4)
		g. Body (5)	Remove	Place drive shaft (6) in bushing (25) of section attached to body (5). Lightly tap drive shaft (6) with plastic hammer until body separates from front plate (3) or back plate (4)
2	Back plate (4)	a. O-ring (8)	Remove and discard	Pull from groove
		b. Thrust plate (9)	Remove and discard	Pull from machined surface
3	Front plate (3)	a. O-ring (8)	Remove and discard	Pull from groove
		CAUTION In the following step, be careful not to scratch or damage machined surface of front plate (3).		
		b. Diaphragm (10)	Remove and discard	Slip a sharp instrument under diaphragm and pry loose from front plate (3)
		c. Two springs (11) anc steel balls (12)	Remove and discard	
		d. Back-up gasket (13) protector gasket (14) and seal (15)	Remove and discard	

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
3 (cont)		e. Shaft seal (16)	Remove and discard	

NOTE

Remove retaining rings (17 and 19) and key (1) only if necessary for replacement. Shafts (6 and 7) and gears (18 and 20) are not serviceable separately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4	Shafts (6 and 7), body (5) and back plate (4)	a. Retaining rings (17 and 19)	Remove	Use snap ring pliers
		b. Key (1)	Remove	

CAUTION

In the following step, be careful not to scratch or damage machined surface of body (5).

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Two dowel pins (21)	Pull and remove	If necessary for replacement
		d. Intake tube (22)	Pull and remove	If necessary for replacement
		e. Plug (23)	Loosen and remove	Serial number 9150018 and below
		f. Cap (23A), coupler (23B), and fitting (23C)	Remove	Serial number 9150019 and above
		g. Connector (23D)	Loosen and remove	Serial number 9150019 and above
		h. O-ring (24)	Remove and discard	

NOTE

Do not attempt to remove bushings (25) from front plate (3) or back plate (4). Bushings are not serviceable separately.

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent P-D-680 used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes and don´t breathe vapors. Do not use near open flame or excessive heat and don´t smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air and medical attention immediately. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water and get medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

5		All Parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air.
INSPECTION				
6		Drive shaft (6)	Inspect	Replace drive shaft and gear (18) if shaft keyway is broken, splines chipped or damaged, or if shaft nicked, burred, or worn to less than 0.873 inch diameter in bushing areas
7		Idler shaft (7)	Inspect	Replace idler shaft and gear (20) if shaft nicked, burred or worn to less than 0.0873 inch diameter in bushing areas
8		Gears (18 and 20)	Inspect	Replace gear (18 or 20) and shaft (6 or 7) if gear teeth chipped or broken, gear ends scored or worn, or if gear width is less than 0.732 inch. Break sharp edges of gear teeth with emery cloth

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
9		Retaining rings (17 and 19)	Inspect	Replace if cracked, worn or damaged
10		Cap screws (2), plug (23), cap (23A), coupler (23B), fitting (23C), and connector (23D)	Inspect	Replace, if worn, or if threads damaged
11		Bushings (25)	Inspect	Replace front plate (3) or back plate (4) if bushings scored or pitted, if oil grooves damaged, front plate bushing not flush with islands in groove pattern, or if bushing worn to less than 0.0879 inch inside diameter
12		Key (1)	Inspect	Replace if cracked or worn, or if loosely fitting in keyway of drive shaft (6)
13		Dowel pins (21) and intake tube (22)	Inspect	Replace if cracked or excessively worn
14		Front plate (3)	Inspect	Replace if machined face scored, pitted or eroded

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
15		Back plate (4)	Inspect	Replace if machined face scored, pitted or eroded, or if threads damaged
16		Body (5)	Inspect	Replace if machined faces scored, pitted or eroded, or if inside diameter of gear pocket scored, pitted, or worn to less than 2.107 inches
REASSEMBLY				
17	Front plate (3)	a. New O-ring (8)	Install	In groove of front plate
		b. New seal (15)	Position and install	With open part of "V" section down, tuck seal (15) into grooves in front plate
		c. New gaskets (14 and 13)	Install	Press into seal (15)
		d. Two new balls (12) and springs (11)	Position	In bores of front plate

CAUTION

In the following step, be sure that diaphragm (10) fits inside rim of seal (15). Also make sure that coils of springs (11) are not wedged between diaphragm (10) and front plate (3).

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Diaphragm (10)	Position and install	Position bronze face up, and press into raised rim of seal (15) and against back-up gasket (13)
18	Shafts (6 and 7)	a. Key (1)	Position	In keyway on shaft (6)
		b. Gears (18 and 20)	Lubricate and position	Dip gears in clean hydraulic oil and position on shafts (6 and 7)
		c. Retaining rings (17 and 19)	Install	Use snap ring pliers
		d. Shafts (6 and 7)	Lubricate and install	Dip bushing area of shafts in clean hydraulic oil and position in bushings (25) of front plate (3)
19	Body (5)	a. Two dowel pins (21)	Install	
		b. Body (5)	Lubricate and install	Apply thin coat of heavy grease to both machined faces of body (5). Position body with small drilled hole in one of the cavities toward pressure side of pump, and with half moon port cavities facing away from front plate (3). Slip body over gears (18 and 20) and onto front plate (3)

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
19 (cont)		c. Thrust plate (9)	Install	Position bronze face towards gears, and side with mid-section cut away toward suction side of pump. Slip thrust plate (9) over gears (18 and 20) and into gear pockets of body (5)
20	Hydraulic pump	a. Intake tube (22)	Install	Place machined surface of back plate (4) on a block of wood. Drive intake tube into back plate bore using a plastic hammer
		b. New O-ring (8)	Install	In groove of back plate (4)
		c. Back plate (4)	Install	Slide over shafts (6 and 7) and against body (5) until dowel pins are engaged
		d. Eight cap screws (2)	Install and tighten	Tighten evenly to 40 pounds foot torque
		e. New O-ring (24)	Position	On plug (23) or connector (23D)
		f. Plug (23)	Install and tighten	Until securely mounted
		g. Connector (23D)	Install and tighten	Serial number 9150019 and above
		h. Fitting (23C)	Install and tighten	Serial number 9150019 and above
		i. Coupler (23B)	Install and tighten	Serial number 9150019 and above
		j. Cap (23A)	Install and tighten	Serial number 9150019 and above

NOTE

Cover end of drive shaft (6) with cellophane tape to protect new shaft seal (16) from sharp edges of shaft.

STEP	LOCATION	ITEM	ACTION	REMARKS
		k. New shaft seal (16)	Install	Dip shaft seal in clean hydraulic oil and slip over drive shaft (6). Seat seal into front plate (3) using 1-15/16 inch seal driver and hammer

3-24. STEERING SYSTEM MAINTENANCE (cont)

c. Hydraulic Pump Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
20 (cont)		1. Drive shaft (6)	Check for binding	Using a wrench or similar tool, rotate drive shaft ten revolutions. The drive shaft should be almost free enough to rotate by hand. If drive shaft binds, disassemble pump and determine cause

3-24. STEERING SYSTEM MAINTENANCE (cont)

d. Steering Cylinder Assembly Repair.

This task covers: a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

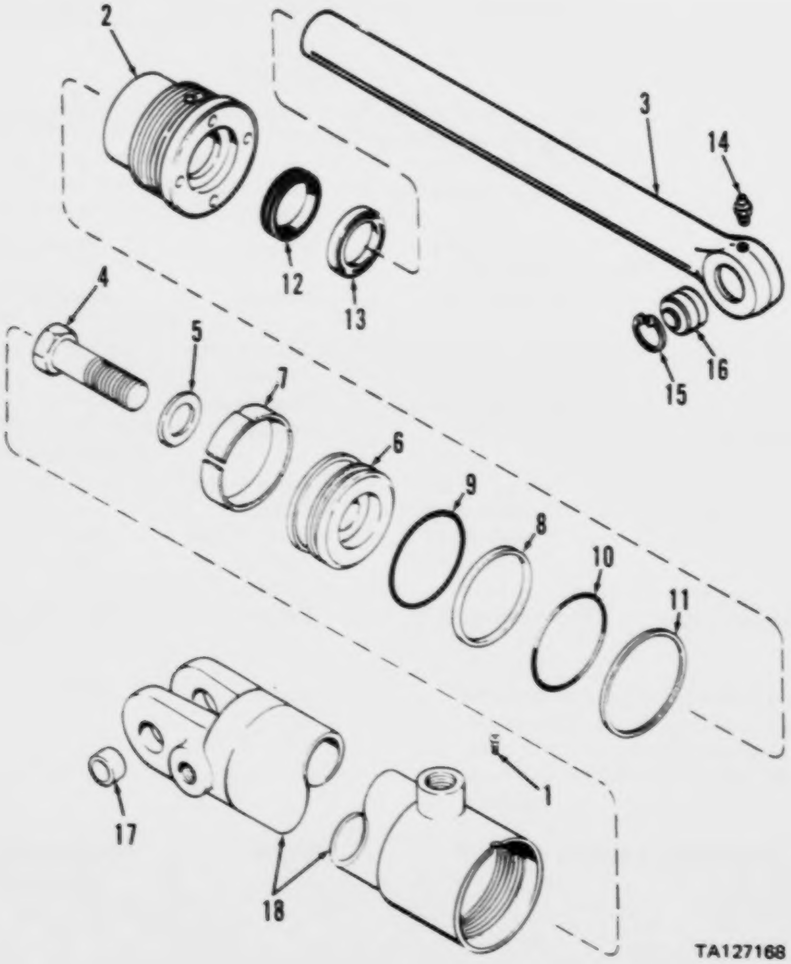
TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Spanner Wrench	FSCM 10988 P/N D44113

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Seal repair kit (FSCM 10988 P/N G34819)

EQUIPMENT CONDITION

Paragraph	Condition Description
2-48c	Steering cylinder assembly removed.



KEY

1. Screw
2. Gland
3. Piston rod
4. Cap screw
5. Flat washer
6. Piston
7. Wear ring
8. Seal ring
9. O-ring
10. O-ring
11. Back-up ring
12. Wiper
13. Rod seal
14. Grease fitting
15. Retaining rings
16. Bushing
17. Bushings
18. Cylinder

3-24. STEERING SYSTEM MAINTENANCE (cont)

d. Steering Cylinder Assembly Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Cylinder (18)	a. Screw (1)	Loosen and remove	
		b. Gland (2)	Loosen	Loosen using spanner wrench (FSCM 10988 P/N D44113)
		c. Piston rod (3) with gland (2)	Pull and remove	From cylinder (18)
2	Piston rod (3)	a. Cap screw (4) and washer (5)	Loosen and remove	
		b. Piston (6)	Pull and remove	From piston rod (3)
		c. Gland (2)	Pull and remove	From piston rod (3)
		NOTE Remove grease fitting (14), retaining ring (15) and bushing (16) only if necessary for replacement.		
		d. Grease fitting (14)	Loosen and remove	
		e. Two retaining rings (15)	Remove	Use snap ring pliers
		f. Bushing (16)	Remove	From piston rod eye
3	Piston (6)	a. Wear ring (7)	Remove and discard	
		b. Seal ring (8) and O-ring (9)	Remove and discard	
4	Gland (2)	a. O-ring (10) and back-up ring (11)	Remove and discard	
		b. Wiper (12) and rod seal (13)	Remove and discard	Use a fine wire to hook wiper and rod seal and pull out of gland
5	Cylinder (18)	Two bushings (17)	Remove	If necessary for replacement

3-24. STEERING SYSTEM MAINTENANCE (cont)

d. Steering Cylinder Assembly Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
6		All parts except bushings (16 and 17)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
7		Screw (1 and 4) and grease fitting (14)	Inspect	Replace if worn, or if threads damaged
8		Gland (2)	Inspect	Replace if cracked or broken, or if threads damaged
9		Piston (6), washer (5) and retaining ring (15)	Inspect	Replace if cracked or damaged
10		Piston rod (3)	Inspect	Repair nicks or scratches with medium grit emery cloth, polishing with a rotary motion. Replace if cracked or bent, if deeply grooved or scored, or if threads damaged
11		Bushings (16 and 17)	Inspect	Replace if cracked or deteriorated

3-24. STEERING SYSTEM MAINTENANCE (cont)

d. Steering Cylinder Assembly Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
12		Cylinder (18)	Inspect	Repair nicks or scratches in cylinder with medium grit emery cloth, polishing with a rotary motion. Replace if cracked or dented, if deeply grooved or scored, or if threads damaged
REASSEMBLY				
13	Gland (2)	a. New rod seal (13)	Install	With seal lip facing piston side of gland
		b. New wiper (12)	Install	Position with wiper lip away from gland, and press into gland until seated
		c. New back-up ring (11) and O-ring (10)	Install	
		d. Gland (2)	Install	Coat bore of gland with clean hydraulic oil and slide gland onto piston rod (3)
14	Piston (6)	a. New O-ring (9)	Install	In narrow groove of piston (6)
		CAUTION Make certain O-ring (9) and seal ring (8) are not rolled when seated.		
		b. New seal ring (8)	Install	Over O-ring (9)
		c. New wear ring (7)	Install	In wide groove of piston
		d. Piston (6)	Install	Position recess in piston toward piston rod (3), and slide assembled piston onto piston rod
15	Piston rod (3)	a. Piston rod (3)	Piston and clamp	In soft jawed vise
		b. Flat washer (5)	Install	On cap screw (4)
		c. Cap screw (4) with washer (5)	Install and tighten	Tighten to 150-180 pounds foot torque
		d. Piston seals and rings (7, 8 and 9)	Lubricate	Coat with clean hydraulic oil
		CAUTION Be careful not to cut or damage O-rings and seals in the following step.		
		e. Piston (6) with piston rod (3)	Install	Remove piston rod from vise and carefully guide piston and rod into cylinder (18)

3-24. STEERING SYSTEM MAINTENANCE (cont)

d. Steering Cylinder Assembly Repair (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
16	Cylinder (18)	a. Cylinder (18)	Position and clamp	In soft jawed vise
		b. Gland (2)	Install and tighten	Use spanner wrench (FSCM 10988 P/N D44113)
		c. Screw (1)	Install and tighten	To retain gland
		d. Grease fitting (14)	Install and tighten	Until securely mounted
		e. Bushings (16 and 17)	Position and install	
		f. Two retaining rings (15)	Install	Use snap ring pliers

Section V. CHASSIS MAINTENANCE

This section contains the information you'll need to maintain the front and rear chassis pivot components. It gives you instructions on how to troubleshoot problems, and repair or replace the components that are within the scope of direct support maintenance.

	Para
Troubleshooting Symptom Index	3-25
Chassis Troubleshooting	3-26
Separation of Front and Rear Chassis	3-27

3-25. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
CHASSIS		
Excessive noise at chassis pivot point when turning	3-26/1	3-190
Excessive play at chassis pivot point when turning	3-26/2	3-190

3-26. CHASSIS TROUBLESHOOTING

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

1. EXCESSIVE NOISE AT CHASSIS PIVOT POINT WHEN TURNING

    Lubricate two grease fittings at chassis pivot points (refer to current lubrication order).

        If lubrication does not reduce noise at pivot points, remove and check grease fittings for damage (para 3-27).

2. EXCESSIVE PLAY AT CHASSIS PIVOT POINT WHEN TURNING

    Carefully observe chassis pivot points while an assistant slowly drives vehicle over rough terrain.

        If excessive play is observed at chassis pivot points, replace pivot bushing, bearing or pin (para 3-27).

3-27. SEPARATION OF FRONT AND REAR CHASSIS

This task covers separation and installation of front and rear chassis.

INITIAL SETUP

TOOLS

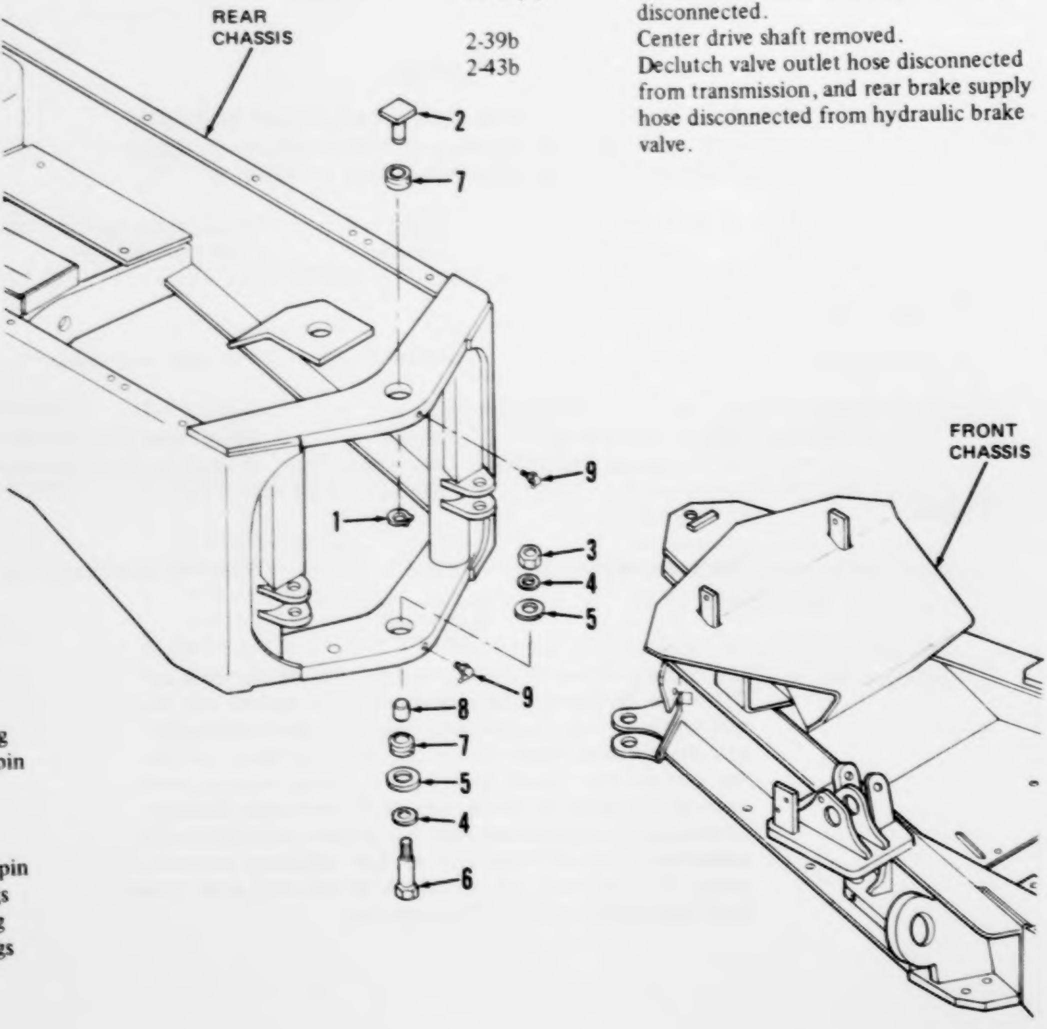
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hard Wooden Blocks (2), 12 by 12 by 30 inches

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
2-33b	Battery ground cable disconnected.
2-15i	Accelerator cable disconnected.
2-34a	Main wiring harness connector unplugged.
2-38b	Transmission linkage cables disconnected.
2-42a	Parking brake linkage disconnected from transmission parking brake.
2-48b(2)	Hydraulic pump hoses disconnected.
2-48c	Steering cylinder rods disconnected from rear chassis.
2-56f(1)	Hydraulic oil filter-to-control valve hose disconnected.
2-39b	Center drive shaft removed.
2-43b	Declutch valve outlet hose disconnected from transmission, and rear brake supply hose disconnected from hydraulic brake valve.



KEY

1. Retaining ring
2. Upper pivot pin
3. Lock nut
4. Washers
5. Spacers
6. Lower pivot pin
7. Pivot bearings
8. Pivot bushing
9. Grease fittings

3-27. SEPARATION OF FRONT AND REAR CHASSIS (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Front chassis	Front chassis	Support	Use hoist or other lifting device attached to ROPS side supports to prevent front chassis from tipping when pulled from rear chassis
2	Rear chassis	a. Wheels and frame	Block	To prevent rear chassis from moving or tipping when front chassis is removed
		b. Retaining ring (1)	Remove	Use snap ring pliers
		c. Upper pivot pin (2)	Lift and remove	If necessary, tap bottom of pivot pin using drift and hammer

WARNING

Front chassis and rear chassis are extremely heavy. Do not proceed unless chassis are secured to prevent movement and tipping. Failure to do so could cause serious injury or death.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Lock nut (3), two washers (4), two spacers (5), and lower pivot pin (6)	Loosen and remove	If necessary, tap top of pivot pin using drift and hammer
3	Front chassis	Front chassis	Remove	Pull from rear chassis
4	Rear chassis	a. Two pivot bearings (7)	Remove	
		b. Pivot bushing (8)	Remove	From lower pivot bearing (7)
		c. Two grease fittings (9)	Loosen and remove	If necessary for replacement
CLEANING				
5		Two pivot bearings (7)	Clean	Wipe with clean cloth only

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

3-27. SEPARATION OF FRONT AND REAR CHASSIS (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
5 (cont)		**WARNING** Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
6		All other parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
7		Two pivot bearings (7)	Inspect	Replace if cracked, worn or deteriorated
8		All other parts	Inspect	Replace if worn, or if threads damaged
INSTALLATION				
9	Rear chassis	a. Two grease fittings (9)	Install and tighten	Until securely mounted, with fitting inlet facing left or right side of vehicle
		b. Pivot bushing (8)	Install	Press into lower pivot bearing (7)
		c. Two pivot bearings (7)	Install	Press into pivot bores in rear chassis
10	Front chassis	Front chassis	Position	Push against rear chassis until upper and lower pivot bores are aligned
11	Rear chassis	a. Upper pivot pin (2)	Install	If necessary, gently tap into bearing (7) using hammer
		b. Retaining ring (1)	Install	Use snap ring pliers
		c. Lower pivot pin (6), with washer (4), and spacer (5)	Install	If necessary, gently tap into bushing (8) using hammer
		d. Spacer (5), washer (4), and lock nut (3)	Install and tighten	Tighten lock nut (3) and lower pivot pin (6) to 340-360 pounds foot torque

Section VI. HYDRAULIC LIFT SYSTEM MAINTENANCE

This section contains the information you'll need to maintain the:

- Control valve
- Hydraulic cylinders
- Mast and carriage assembly

It gives you instructions on how to troubleshoot problems and repair or replace the components that are within the scope of direct support maintenance.

	Para
Troubleshooting Index	3-28
Hydraulic Lift System Troubleshooting	3-29
Hydraulic Lift System Maintenance	3-30
Control Valve	3-30a
Tilt Cylinder Assemblies	3-30b
Sideshift Cylinder Assembly	3-30c
Rotation Cylinder Assembly	3-30d
Lift Cylinder Assembly	3-30e
Mast Assembly Maintenance	3-31
Carriage Assembly	3-31a
Side Shifter Frame and Rotation Bearing	3-31b
Inner and Outer Mast	3-31c

3-28. TROUBLESHOOTING SYMPTOM INDEX

	Para/Malfunction	Page
HYDRAULIC LIFT SYSTEM		
Unable to lift a load (all other functions normal)	3-29/1	3-194
Load drifts down	3-29/2	3-197
Unable to sideshift load (all other functions normal)	3-29/3	3-197
Sideshift cylinder assembly operation sluggish	3-29/4	3-198
Unable to tilt load (all other functions normal)	3-29/5	3-199
Tilt cylinder assemblies operation sluggish	3-29/6	3-201
Unable to rotate load (all other functions normal)	3-29/7	3-201
Rotation operation sluggish	3-29/8	3-202

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. UNABLE TO LIFT A LOAD (ALL OTHER FUNCTIONS NORMAL)

NOTE

After completion of each check, lower forks until resting on ground. Then, turn engine off.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. UNABLE TO LIFT A LOAD (ALL OTHER FUNCTIONS NORMAL) (cont)

Step 1. Start engine and operate at idle speed.

NOTE

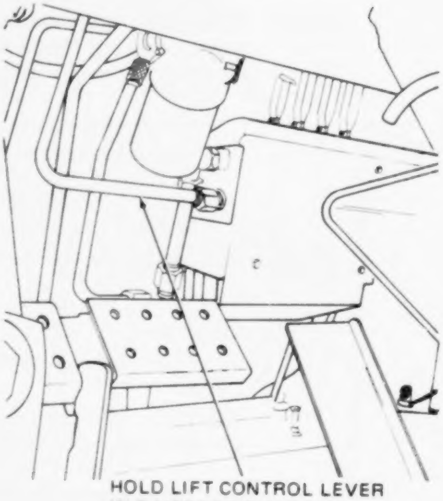
Increase engine speed as necessary in following steps to prevent engine stall.

With no load on forks, place LIFT control lever in RAISE position until tube assembly shown is warm to touch (mast assembly will be at full height).

WARNING

Don't look directly down at fitting when performing following steps; hydraulic oil is under pressure. Serious injury may result.

Loosen bleed fitting at top of lift cylinder assembly.


HOLD LIFT CONTROL LEVER IN RAISE POSITION UNTIL THIS TUBE ASSEMBLY IS WARM TO TOUCH

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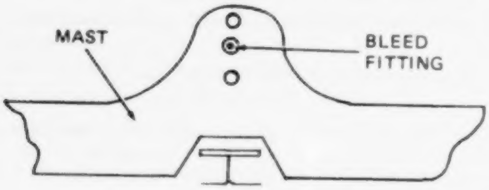

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While an assistant places LIFT control lever in RAISE position, observe fitting at top of lift cylinder assembly for hydraulic oil leakage. (Slight weeping of oil is permissible.)

a. If hydraulic oil leakage (other than slight weeping) is observed, remove lift cylinder assembly (para 3-30e) and check piston assembly and wear rings (para 3-30e); repair/replace as necessary.

b. If hydraulic oil leakage is not observed, tighten bleed fitting and proceed to step 2.

Step 2. With engine operating at idle speed and LIFT control lever in RAISE position (mast assembly will be at full height), check for hydraulic oil leakage at end cap assembly (located at top of lift cylinder assembly) and at gland assembly (located at top of lift cylinder body).

NOTE

Increase engine speed as necessary to prevent engine stall.

a. If hydraulic oil leakage is observed, remove lift cylinder assembly (para 3-30e), and repair or replace gland assembly or end cap assembly (para 3-30e).

b. If hydraulic oil leakage is not observed, proceed to step 3.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. UNABLE TO LIFT A LOAD (ALL OTHER FUNCTIONS NORMAL) (cont)

Step 3. With engine at idle speed and LIFT control lever in RAISE position (mast assembly will be at full height), check for hydraulic oil leakage at gland assembly (located at bottom of lift cylinder assembly) and at ring assembly (located at bottom of lift cylinder body).

a. If hydraulic oil leakage is observed, remove lift cylinder assembly (para 3-30e), and repair or replace gland assembly or ring assembly (para 3-30e).

b. If hydraulic oil leakage is not observed, proceed to step 4.

Step 4. Start engine and operate at idle speed.

NOTE

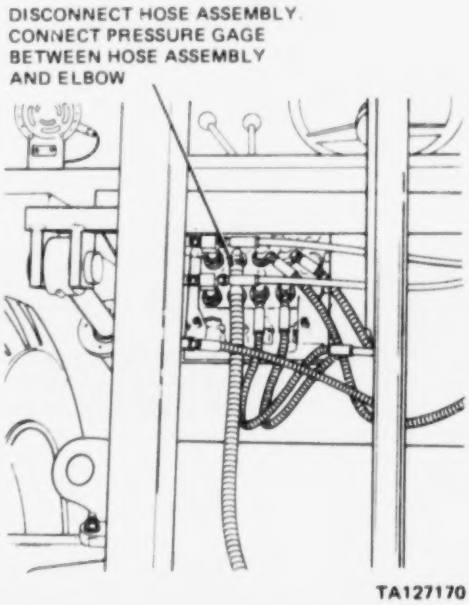
Increase engine speed as necessary to prevent engine stall.

Place LIFT control lever in RAISE position and hold (mast assembly will be at full height). Check control valve for hydraulic oil leakage.

a. Replace or repair control valve (para 3-30a) if hydraulic oil leakage is observed.

b. If hydraulic oil leakage is not observed, proceed to step 5.

Step 5. With engine off, operate control levers several times to relieve hydraulic pressure. Disconnect hose assembly connected between control valve and lift cylinder assembly at control valve (refer to illustration). Connect a 3000 PSI pressure gage between elbow on control valve and hose assembly.


DISCONNECT HOSE ASSEMBLY. CONNECT PRESSURE GAGE BETWEEN HOSE ASSEMBLY AND ELBOW
TA127170

NOTE

Increase engine speed as necessary to prevent engine stall.

Start engine and place LIFT control lever in RAISE position until mast assembly is at full height; continue to hold lever in RAISE position. Pressure gage shall indicate 2500-2550 PSI with engine at full throttle.

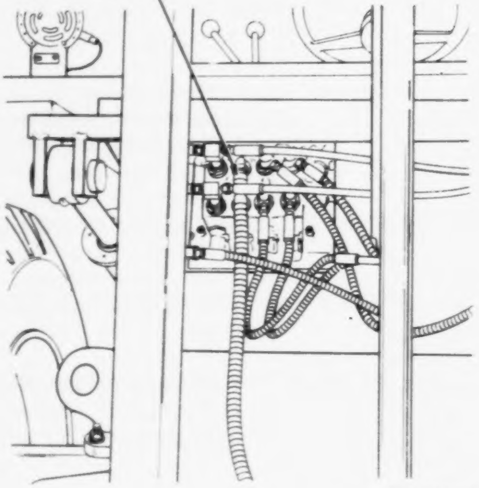
a. If pressure gage indication is above or below 2500-2550 PSI, adjust pressure relief valve (para 2-48b(2), step 23).

b. If pressure gage indication is between 2500-2550 PSI, remove and repair lift cylinder assembly (para 3-30e).

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. LOAD DRIFTS DOWN


DISCONNECT HOSE ASSEMBLY. CONNECT PRESSURE GAGE BETWEEN HOSE ASSEMBLY AND ELBOW

TA127170

NOTE

After completion of each check, lower forks until resting on ground. Then, turn engine off.

With engine off, operate control levers several times to relieve hydraulic pressure. Disconnect hose assembly connected between control valve and lift cylinder assembly at control valve (refer to illustration).

NOTE

Increase engine speed as necessary to prevent engine stall.

Connect a 3000 PSI pressure gage between elbow on control valve and hose assembly.
Start engine and place LIFT control lever in RAISE position until mast assembly is at full height; continue to hold lever in RAISE position until pressure gage indicates 2500-2550 PSI with engine at full throttle.
With LIFT control lever in neutral position, observe pressure gage and mast assembly.

a. If mast assembly drifts down and pressure gage indication does not decrease, remove and repair lift cylinder assembly (para 3-30e).

b. If pressure gage indication decreases, replace or repair control valve (para 3-30a).

3. UNABLE TO SIDESHIFT LOAD (ALL OTHER FUNCTIONS NORMAL)

NOTE

After completion of each check, turn engine off.

Step 1. Check sideshift cylinder assembly for hydraulic oil leakage.

a. If hydraulic oil leakage is observed, remove and repair sideshift cylinder assembly (para 3-30c).

b. If hydraulic oil leakage is not observed, proceed to step 2.

Step 2. Check hose assemblies between sideshift cylinder assembly and control valve for hydraulic oil leakage.

a. If hydraulic oil leakage is observed at hose assemblies, replace leaking hose assembly (para 2-56f).

b. If hydraulic oil leakage is not observed at hose assemblies, proceed to step 3.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. UNABLE TO SIDESHIFT LOAD (ALL OTHER FUNCTIONS NORMAL) (cont)

Step 3. Check control valve for hydraulic oil leakage.

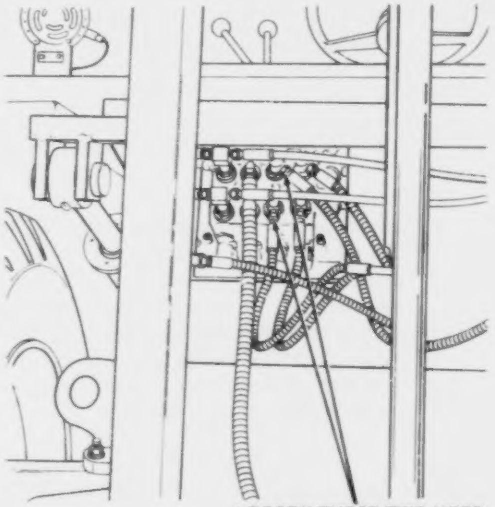
a. If hydraulic oil leakage is observed at control valve, remove and repair it (para 3-30a).

b. If hydraulic oil leakage is not observed at control valve, proceed to step 4.

Step 4. Crack (loosen) fittings shown at side. Start engine and operate at idle speed. Place SHIFT control lever in LEFT position and check if hydraulic oil flows from fittings; place SHIFT control lever in RIGHT position and check if hydraulic oil flows from fittings.

a. If hydraulic oil does not flow from fittings, replace control valve (para 3-30a).

b. If hydraulic oil flows from fittings, remove and repair sideshift cylinder assembly (para 3-30c) (tighten fittings).


LOOSEN THESE TWO HOSE FITTINGS (TIGHTEN AFTER COMPLETION OF CHECKS)

TA127171

4. SIDESHIFT CYLINDER ASSEMBLY OPERATION SLUGGISH

NOTE

After completion of each check, turn engine off.

Step 1. Check pressure relief valve setting (para 2-48b(2), steps 20 through 22).

a. If pressure relief valve setting is not correct, adjust for proper setting (para 2-48b(2), step 23).

b. If pressure relief valve setting is okay, proceed to step 2.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4. SIDESHIFT CYLINDER ASSEMBLY OPERATION SLUGGISH (cont)

Step 2. Start engine and operate at idle speed.
Place SHIFT control lever in LEFT position until forks are in extreme left position.
Turn engine off and operate control levers several times to relieve hydraulic pressure.
Disconnect and cap hose fitting connected to rod end of sideshift cylinder assembly.

CAUTION

Don't place SHIFT control lever in RIGHT position in following steps; hydraulic oil will flow out of disconnected hose fitting.

Start engine and operate at idle speed.
Place SHIFT control lever in LEFT position and hold while an assistant checks for hydraulic oil leakage at sideshift cylinder assembly port from which fitting was disconnected.

a. Remove sideshift cylinder assembly and repair piston assembly (para 3-30c) if hydraulic oil leakage is observed.

b. If hydraulic oil leakage is not observed at sideshift cylinder assembly port, remove and repair control valve (para 3-30a).

5. UNABLE TO TILT LOAD (ALL OTHER FUNCTIONS NORMAL)

NOTE

After completion of each check, turn engine off.

Step 1. Check tilt cylinder assemblies for hydraulic oil leakage.

a. If hydraulic oil leakage at tilt cylinder assemblies is observed, remove and repair it (para 3-30b).

b. If hydraulic oil leakage is not observed at tilt cylinder assemblies, proceed to step 2.

Step 2. Check hose assemblies between tilt cylinder assemblies and control valve for hydraulic oil leakage.

a. If hydraulic oil leakage is observed at hose assemblies, replace leaking hose assemblies (para 2-56f).

b. If hydraulic oil leakage is not observed, proceed to step 3.

Step 3. Check control valve for hydraulic oil leakage.

a. If hydraulic oil leakage is observed at control valve, remove and repair it (para 3-30a).

b. If hydraulic oil leakage is not observed, proceed to step 4.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

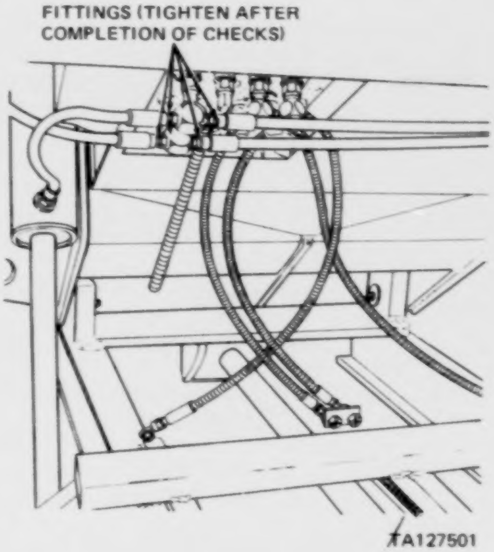
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. UNABLE TO TILT LOAD (ALL OTHER FUNCTIONS NORMAL) (cont)

Step 4. Crack (loosen) fittings shown at side. Start engine and operate at idle speed. Place LIFT control lever in RAISE position until forks are three feet from ground. Place TILT control lever in FWD position and check if hydraulic oil flows from loosened fittings; place TILT control lever in REAR position and check if hydraulic oil flows from loosened fittings.

a. If hydraulic oil does not flow from loosened fittings, replace control valve (para 3-30a).

b. If hydraulic oil flows from fittings, proceed to step 5 (tighten fittings loosened above).



Step 5. Start engine and operate at idle speed. Place TILT control lever in FWD position until mast assembly is tilted fully forward. Turn engine off and operate control levers several times to relieve hydraulic pressure. Disconnect and cap hose fitting connected to rod end of tilt cylinder assembly.

CAUTION

Don't place TILT control lever in REAR position in following steps. Hydraulic oil will flow out of disconnected hose fitting.

Start engine and operate at idle speed.
Place TILT control lever in FWD position and hold while an assistant checks for hydraulic oil leakage at tilt cylinder assembly port from which fitting was disconnected.
Repeat the above for other tilt cylinder assembly.

a. Remove tilt cylinder assembly and repair piston assembly (para 3-30b) if hydraulic oil leakage is observed.

b. If hydraulic oil leakage is not observed, remove and repair control valve (para 3-30a).

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. TILT CYLINDER ASSEMBLIES OPERATION SLUGGISH

NOTE

After completion of each check, turn engine off.

Step 1. Check pressure relief valve setting (para 2-48b(2), steps 20 through 22).

a. If pressure relief valve setting is not correct, adjust for proper setting (para 2-48b(2), step 23).

b. If pressure relief valve setting is okay, proceed to step 2.

Step 2. Perform step 5 of MALFUNCTION entry 5 above.

Same as step 5 of MALFUNCTION entry 5 above.

7. UNABLE TO ROTATE LOAD (ALL OTHER FUNCTIONS NORMAL)

NOTE

After completion of each check, turn engine off.

Step 1. Check rotation cylinder assembly for hydraulic oil leakage.

a. If rotation cylinder assembly is leaking hydraulic oil, remove and repair it (para 3-30d).

b. If rotation cylinder assembly is not leaking hydraulic oil, proceed to step 2.

Step 2. Check hose assemblies between rotation cylinder assembly and control valve for hydraulic oil leakage.

a. If hose assemblies are leaking hydraulic oil, replace (para 2-56f).

b. If hose assemblies are okay, proceed to step 3.

Step 3. Check control valve for hydraulic oil leakage.

a. If control valve is leaking hydraulic oil, remove and repair it (para 3-30a).

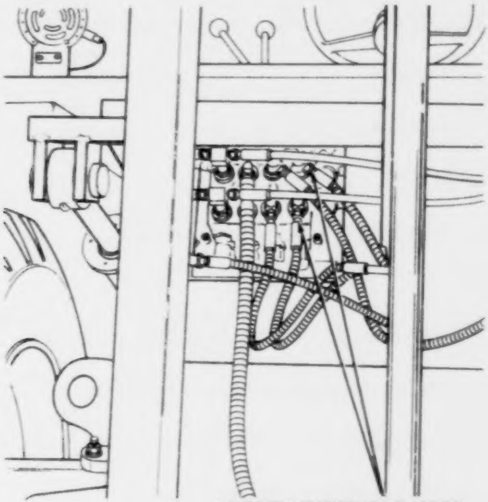
b. If control valve is okay, proceed to step 4.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. UNABLE TO ROTATE LOAD (ALL OTHER FUNCTIONS NORMAL) (cont)

Step 4. Crack (loosen) fittings shown below.
Start engine and operate at idle speed.
Place **LIFT** control lever in **RAISE** position until forks are three feet from ground.
Place **ROTATE** control lever in **CCW** position and check if hydraulic oil flows from fittings; place **ROTATE** control lever in **CW** position and check if hydraulic oil flows from fittings.


LOOSEN THESE TWO HOSE FITTINGS (TIGHTEN AFTER COMPLETION OF CHECKS)

TA127172

a. If hydraulic oil does not flow from fittings, remove and repair control valve (para 3-30a).

b. If hydraulic oil flows from fitting, remove and repair rotation cylinder assembly (para 3-30d) (tighten fittings loosened above).

8. ROTATION OPERATION SLUGGISH

NOTE

After completion of each check, lower forks until resting on ground.
Then, turn engine off.

Step 1. Check pressure relief valve setting (para 2-48b(2), steps 20 through 22).

a. If pressure relief valve setting is not correct, adjust for proper setting (para 2-48b(2), step 23).

b. If pressure relief valve setting is okay, proceed to step 2.

3-29. HYDRAULIC LIFT SYSTEM TROUBLESHOOTING (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

8. ROTATION OPERATION SLUGGISH (cont)

Step 2. Start engine and operate at idle speed.
Place LIFT control lever in RAISE position until forks are three feet from ground.
Place ROTATE control lever in CCW position until forks are in extreme CCW position.
Turn engine off and operate control levers several times to relieve hydraulic pressure.
Disconnect and cap hose fitting connected to rod end of rotation cylinder assembly.

CAUTION

Don't place ROTATE control lever in CW position in following steps; hydraulic oil will flow out of disconnected hose fitting.

Start engine and operate at idle speed.
Place ROTATE control lever in CCW position and hold while an assistant checks for hydraulic oil leakage at rotation cylinder assembly port from which fitting was disconnected.

a. Remove and repair rotation cylinder assembly (repair or replace piston assembly) (para 3-30d) if hydraulic oil leakage is observed.

b. If hydraulic oil leakage is not observed, remove and repair control valve (para 3-30a).

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE

a. Control Valve.

This task covers:
a. Removal
b. Disassembly
c. Cleaning
d. Inspection/Repair
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS

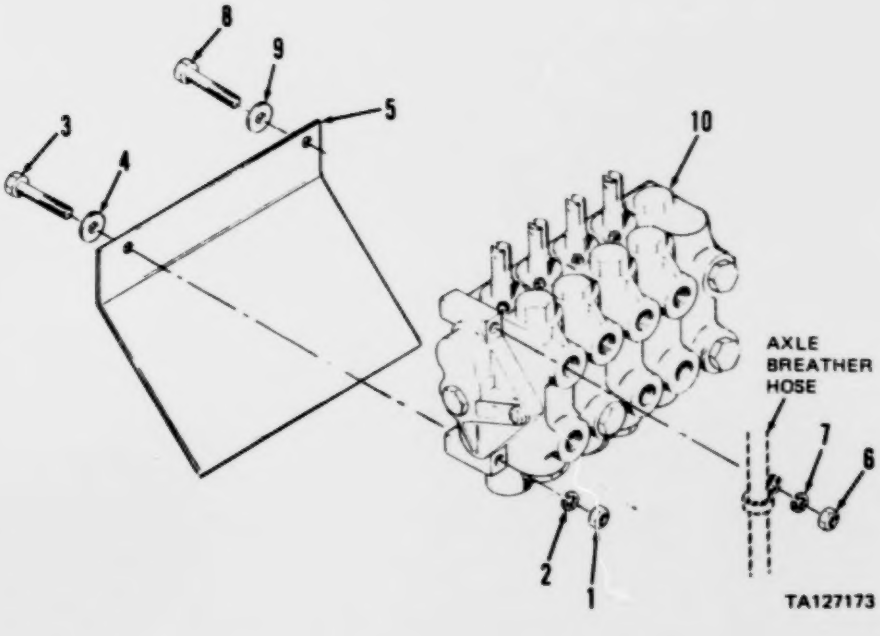
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Clean hydraulic oil (refer to current lubrication order)
Seal kit
Spool positioner kit
Spool seal retainer kit
Load check plug kit
Load check plug seal kit
Relief plug kit
Relief plug seal kit

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, mast tilted forward, forks resting on ground, engine off, and parking brake applied.
2-53h	Noise baffle mat removed.
	All control levers on control valve operated several times to relieve hydraulic pressure.
2-56g(1)	Hydraulic reservoir drained.



KEY

1. Nuts
2. Lock washers
3. Cap screws
4. Washers
5. Oil drip pan
6. Nut
7. Lock washer
8. Cap screw
9. Washer
10. Control valve

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

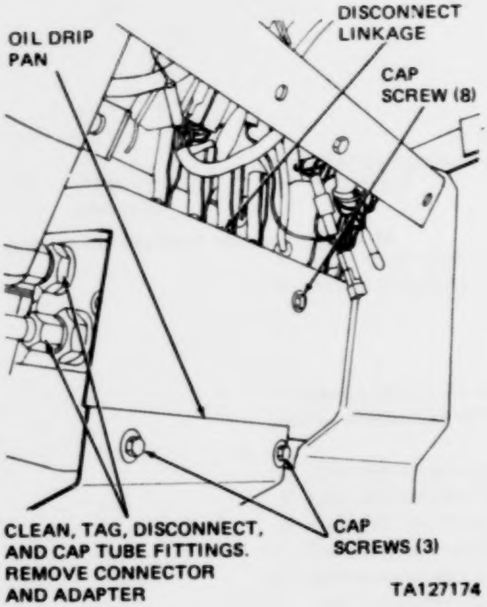
a. Control Valve (cont).

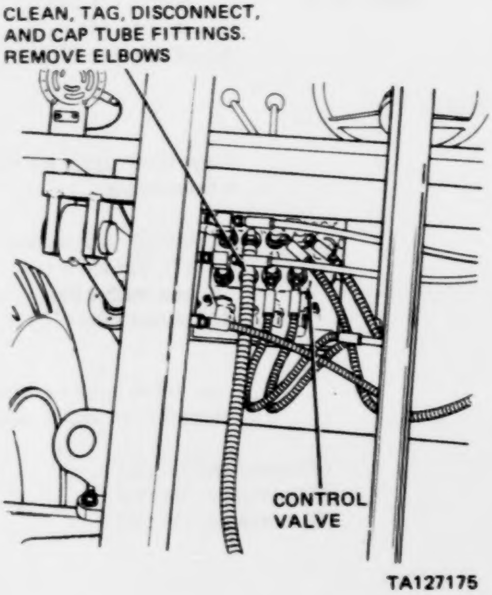
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Operator's compartment, control valve	a. Control valve linkage	Disconnect	Para 2-56b, step 2

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Tube fittings	Clean	Use clean cloth moistened with cleaning solvent P-D-680 and remove all dirt and grease
		c. Tube fittings	Tag, disconnect and cap	Para 2-56f(1), steps 1a, 1c, 1h, and 1j


OIL DRIP PAN
DISCONNECT LINKAGE
CAP SCREW (8)
CLEAN, TAG, DISCONNECT, AND CAP TUBE FITTINGS. REMOVE CONNECTOR AND ADAPTER
CAP SCREWS (3)
TA127174


CLEAN, TAG, DISCONNECT, AND CAP TUBE FITTINGS. REMOVE ELBOWS
CONTROL VALVE
TA127175

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Front of vehicle, control valve	a. Tube fittings	Clean	Use clean cloth moistened with cleaning solvent P-D-680 and remove all dirt and grease
		b. Tube fittings	Tag, disconnect and cap	Para 2-56f(1), steps 2a through 2f
		c. Elbows	Remove	Para 2-56f(1), steps 2g through 2h
3	Operator's compartment, control valve	a. Two nuts (1), lock washers (2), cap screws (3), and washers (4)	Remove	
		b. Oil drip pan (5)	Remove	

CAUTION

Support control valve when performing following step to prevent it from falling.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Nut (6), lock washer (7), cap screw (8), and washer (9)	Remove	Move axle breather hose and clamp away
		d. Control valve (10)	Remove	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

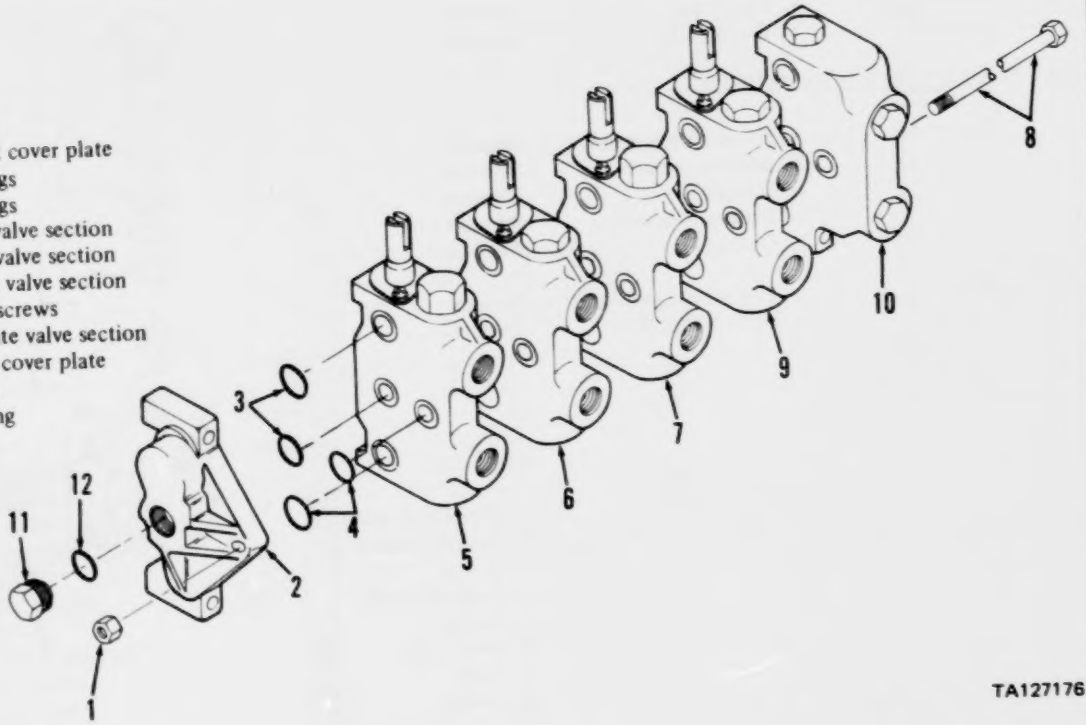
a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

DISASSEMBLY INTO SECTIONS

KEY

1. Nuts
2. Right cover plate
3. O-rings
4. O-rings
5. Tilt valve section
6. Lift valve section
7. Shift valve section
8. Cap screws
9. Rotate valve section
10. Left cover plate
11. Plug
12. O-ring



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STEP	LOCATION	ITEM	ACTION	REMARKS
4	Right cover plate (2)	Three nuts (1)	Remove	
5		a. Right cover plate (2)	Remove	Lift off cap screws (8)
		b. O-rings (3 and 4)	Remove	

NOTE

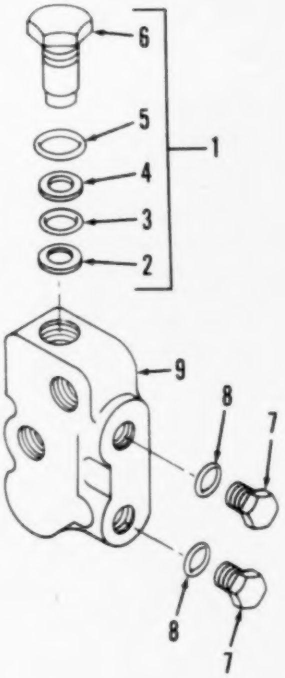
O-rings (3 and 4) are located between valve sections and cover plates. Remove as valve sections and cover plates are removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Tilt valve section (5)	Remove	Lift off cap screws (8)
		d. Lift valve section (6)	Remove	Lift off cap screws (8)
		e. Shift valve section (7)	Remove	Lift off cap screws (8)
		f. Three cap screws (8)	Remove	
		g. Rotate valve section (9) and left cover plate (10)	Separate	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY INTO SECTIONS (cont)				
6	Right cover plate (2)	a. Plug (11) b. O-ring (12)	Remove Remove	
LEFT COVER PLATE DISASSEMBLY				
7	Top	a. Relief plug assembly (1) b. Back-up washer (2) c. O-ring (3) d. Back-up washer (4) e. O-ring (5)	Remove Remove Remove Remove Remove	
8	Rear	a. Two plugs (7) b. Two O-rings (8)	Remove Remove	



KEY

1. Relief plug assembly
2. Back-up washer
3. O-ring
4. Back-up washer
5. O-ring
6. Relief plug
7. Plugs
8. O-rings
9. Left end cover plate

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STEP	LOCATION	ITEM	ACTION	REMARKS
ROTATE, SIDESHIFT, AND TILT VALVE SECTIONS DISASSEMBLY				
9	Top	a. Two screws (1) b. Seal plate (2)	Remove Remove	
10	Bottom	a. Two screws (3) b. Bonnet (4)	Remove Remove	
11	Top	Spool (8)	Remove	Use rod inserted in pin hole to remove. Don't use wrench or pliers

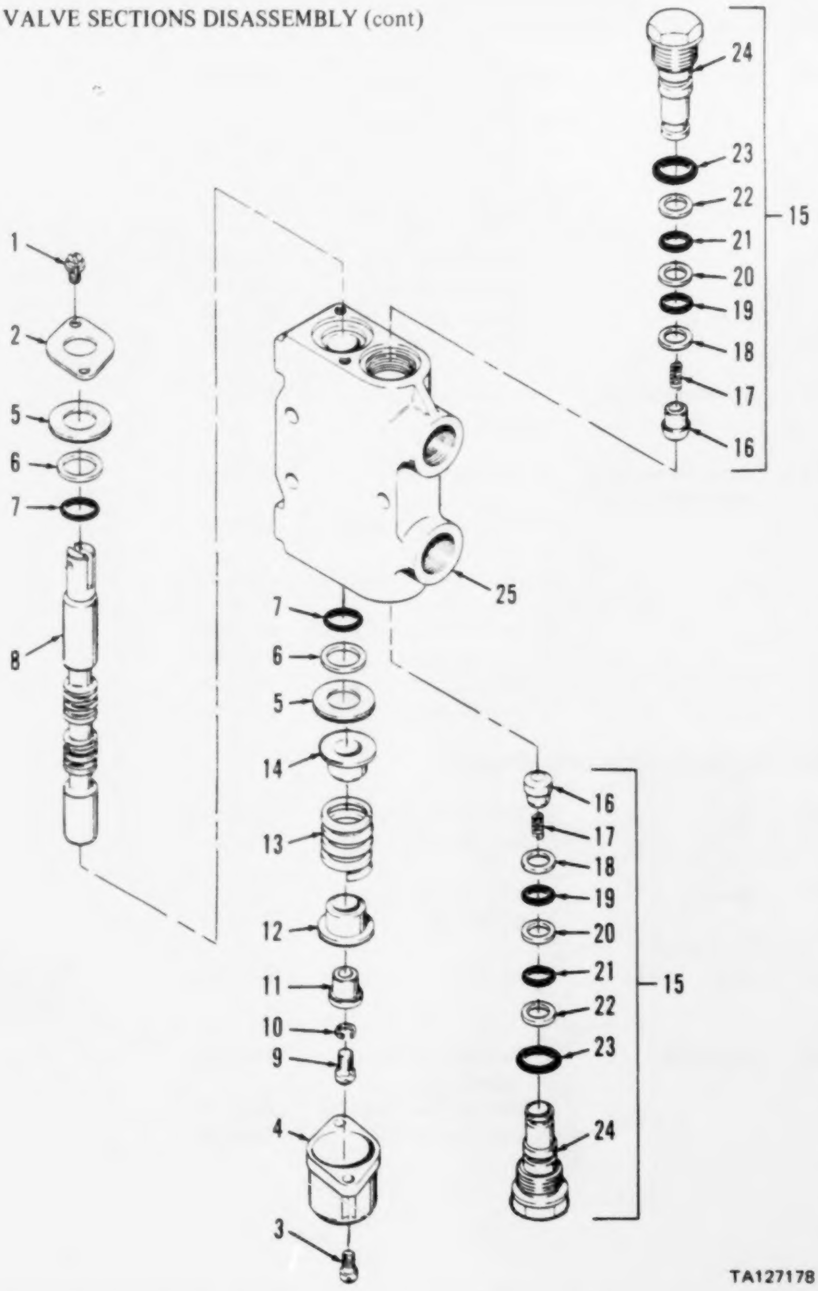
3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ROTATE, SIDESHIFT, AND TILT VALVE SECTIONS DISASSEMBLY (cont)				

KEY

1. Screws
2. Seal plate
3. Screws
4. Bonnet
5. Seal retainer plates
6. Back-up rings
7. O-rings
8. Spool
9. Screw
10. Lock washer
11. Spool collar
12. Spring collar
13. Return spring
14. Spring collar
15. Load check plug assemblies
16. Load check poppets
17. Poppet springs
18. Back-up rings
19. O-rings
20. Back-up rings
21. O-rings
22. Back-up rings
23. O-rings
24. Check plugs
25. Housing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3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ROTATE, SIDESHIFT, AND TILT VALVE SECTIONS DISASSEMBLY (cont)				
12	Spool (8)	a. Two seal retainer plates (5)	Remove	
		b. Two back-up rings (6)	Remove	
		c. Two O-rings (7)	Remove	
13	Bottom	a. Screw (9) and lock washer (10)	Remove	
		b. Spool collar (11)	Remove	
		c. Spring collar (12)	Remove	
		d. Return spring (13)	Remove	
		e. Spring collar (14)	Remove	
14	Bottom and top	Two load check plug assemblies (15)	Remove	
15	Load check plug assemblies (15)	a. Two load check poppets (16)	Remove	
		b. Two poppet springs (17)	Remove	
		c. Two back-up rings (18)	Remove	
		d. Two O-rings (19)	Remove	
		e. Two back-up rings (20)	Remove	
		f. Two O-rings (21)	Remove	
		g. Two back-up rings (22)	Remove	
		h. Two O-rings (23)	Remove	
LIFT VALVE SECTION DISASSEMBLY				
16	Top	a. Two screws (1)	Remove	
		b. Seal plate (2)	Remove	
17	Bottom	a. Two screws (3)	Remove	
		b. Bonnet (4)	Remove	
18	Top	Spool (8)	Remove	Use rod inserted in pin hole to remove. Don't use wrench or pliers
19	Spool (8)	a. Two seal retainer plates (5)	Remove	
		b. Two back-up rings (6)	Remove	
		c. Two O-rings (7)	Remove	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

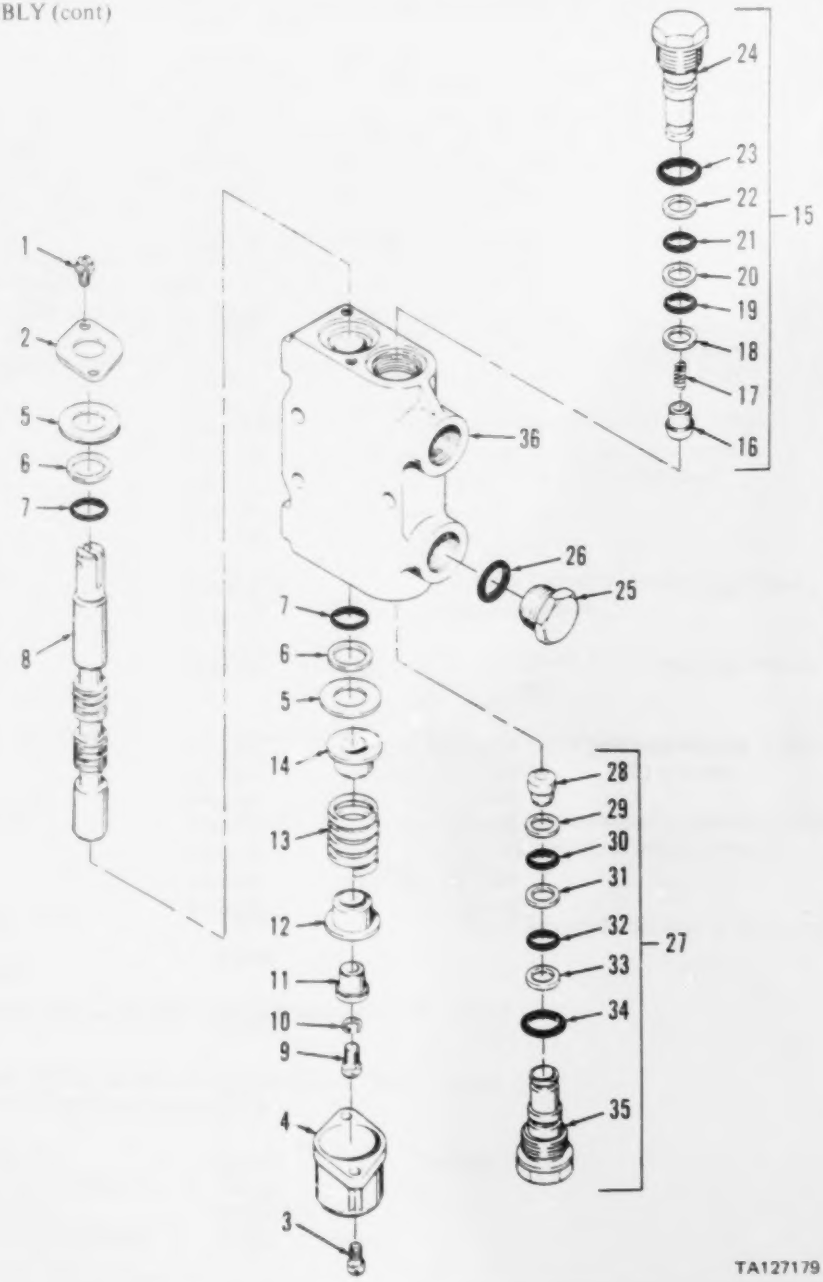
a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

LIFT VALVE SECTION DISASSEMBLY (cont)

KEY

1. Screws
2. Seal plate
3. Screws
4. Bonnet
5. Seal retainer plates
6. Back-up rings
7. O-rings
8. Spool
9. Screw
10. Lock washer
11. Spool collar
12. Spring collar
13. Return spring
14. Spring collar
15. Load check plug assembly
16. Load check poppet
17. Poppet spring
18. Back-up ring
19. O-ring
20. Back-up ring
21. O-ring
22. Back-up ring
23. O-ring
24. Check plug
25. Plug
26. O-ring
27. Conversion plug assembly
28. Plug
29. Back-up ring
30. O-ring
31. Back-up ring
32. O-ring
33. Back-up ring
34. O-ring
35. Check plug
36. Housing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3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
LIFT VALVE SECTION DISASSEMBLY (cont)				
20	Bottom	a. Screw (9) and lock washer (10)	Remove	
		b. Spool collar (11)	Remove	
		c. Spring collar (12)	Remove	
		d. Return spring (13)	Remove	
		e. Spring collar (14)	Remove	
21	Top	Load check plug assembly (15)	Remove	
22	Load check plug assembly (15)	a. Load check poppet (16)	Remove	
		b. Poppet spring (17)	Remove	
		c. Back-up ring (18)	Remove	
		d. O-ring (19)	Remove	
		e. Back-up ring (20)	Remove	
		f. O-ring (21)	Remove	
		g. Back-up ring (22)	Remove	
		h. O-ring (23)	Remove	
23	Side	a. Plug (25)	Remove	
		b. O-ring (26)	Remove	
24	Bottom	Conversion plug assembly (27)	Remove	
25	Conversion plug assembly (27)	a. Plug (28)	Remove	
		b. Back-up ring (29)	Remove	
		c. O-ring (30)	Remove	
		d. Back-up ring (31)	Remove	
		e. O-ring (32)	Remove	
		f. Back-up ring (33)	Remove	
		g. O-ring (34)	Remove	

NOTE

Discard all O-rings; these will be replaced at reassembly.

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
26		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly. Be sure that bores in housings are thoroughly clean
INSPECTION/REPAIR				
27		Springs	Inspect	Replace if distorted, cracked or fatigue signs are evident
28		Spools	Inspect	Replace if finish is damaged or if bent or damaged
29		Screws and plugs	Inspect	Replace if threads damaged in any way, or corroded.
30		Housings	Inspect	Replace if bores damaged, cracked, internal threads damaged, or internal wear is evident
31		All other parts	Inspect	Replace if damaged, cracked, or distorted
LEFT COVER PLATE REASSEMBLY				

NOTE

Lubricate all O-rings before reassembly with clean hydraulic oil (refer to current lubrication order).

STEP	LOCATION	ITEM	ACTION	REMARKS
32	Relief plug (6)	a. O-ring (5) b. Back-up washer (4) c. O-ring (3) d. Back-up washer (2)	Install Install Install Install	On plug (6)

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
LEFT COVER PLATE REASSEMBLY (cont)				
33	Plugs (7)	O-rings (8)	Install	On plugs (7)
34	Top	Relief plug assembly (1)	Install	In cover plate (9)
35	Rear	Plugs (7) with O-rings (8)	Install	In cover plate (9)
ROTATE, SIDESHIFT, AND TILT VALVE SECTIONS REASSEMBLY				
36	Check plugs (24)	a. Two O-rings (23) b. Two back-up rings (22) c. Two O-rings (21) d. Two back-up rings (20) e. Two O-rings (19) f. Two back-up rings (18) g. Two poppet springs (17) h. Two load check poppets (16)	Install Install Install Install Install Install Install Install	On check plugs (24)
37	Housing (25), top and bottom	Two check plug assemblies (15)	Install	
38	Spool (8)	a. Two O-rings (7) b. Two back-up rings (6) c. Two seal retainer plates (5)	Install Install Install	On spool (8)
39	Housing (25), top	a. Spool (8) b. Seal plate (2) c. Two screws (1)	Install Position Install	In housing bore
40	Housing (25), bottom	a. Spring collar (14) b. Return spring (13) c. Spring collar (12) d. Spool collar (11) e. Lock washer (10) and screw (9) f. Bonnet (4) g. Two screws (3)	Install Install Install Install Install Position Install	
LIFT VALVE SECTION REASSEMBLY				
41	Check plug (35)	a. O-ring (34) b. Back-up ring (33) c. O-ring (32)	Install Install Install	On check plug (35)

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
LIFT VALVE SECTION REASSEMBLY (cont)				
41 (cont)		d. Back-up ring (31) e. O-ring (30) f. Back-up ring (29) g. Plug (28)	Install Install Install Install	
42	Housing (36), bottom	Conversion plug assembly (27)	Install	
43	Housing (36), rear	a. O-ring (26) b. Plug (25)	Position Install	On plug (25)
44	Check plug (24)	a. O-ring (23) b. Back-up ring (22) c. O-ring (21) d. Back-up ring (20) e. O-ring (19) f. Back-up ring (18) g. Poppet spring (17) h. Load check poppet (16)	Install Install Install Install Install Install Install Install	On check plug (24)
45	Housing (36), top	Load check plug assembly (15)	Install	
46	Spool (8)	a. Two O-rings (7) b. Two back-up rings (6) c. Two seal retainer plates (5)	Install Install Install	On spool (8)
47	Housing (36), top	a. Spool (8) b. Seal plate (2) c. Two screws (1)	Install Position Install	
48	Housing (36), bottom	a. Spring collar (14) b. Return spring (13) c. Spring collar (12) d. Spool collar (11) e. Lock washer (10) and screw (9) f. Bonnet (4) g. Two screws (3)	Install Install Install Install Install Position Install	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
FINAL REASSEMBLY				
49	Left cover plate (10)	a. Three cap screws (8)	Install	In cover plate (10). Place cover plate on bench
		b. O-rings (3 and 4)	Position	In cover plate (10) bores
		c. Rotate valve section (9)	Position	On cover plate. Be sure O-rings are seated in bores
50	Rotate valve section (9)	a. O-rings (3 and 4)	Position	In rotate valve section bores
		b. Shift valve section (7)	Position	On rotate valve section. Be sure O-rings are seated in bores
51	Shift valve section (7)	a. O-rings (3 and 4)	Position	In shift valve bores
		b. Lift valve section (6)	Position	On rotate valve section. Be sure O-rings are seated in bores
52	Lift valve section (6)	a. O-rings (3 and 4)	Position	In lift valve section bores
		b. Tilt valve section (5)	Position	On lift valve section. Be sure O-rings are seated in bores
53	Tilt valve section (5)	a. O-rings (3 and 4)	Position	In tilt valve section bores
		b. Right cover plate (2)	Position	On tilt valve section. Be sure O-rings are seated in bores
54	Right cover plate (2)	a. Three nuts (1)	Install	Tighten to 18-22 pounds foot torque
		b. O-ring (12)	Position	On plug (11)
		c. Plug (11)	Install	
INSTALLATION/REPLACEMENT				
55	Operator's compartment, control valve mounting area	a. Control valve (10)	Position	
		b. Washer (9) and cap screw (8)	Install	Position axle breather hose clamp on cap screw (8)
		c. Lock washer (7) and nut (6)	Install and tighten	
		d. Oil drip pan (5)	Position	
		e. Two washers (4) and cap screws (3)	Install	
		f. Two lock washers (2) and nuts (1)	Install and tighten	
		g. Adapter and connector	Install	Para 2-56f(1), steps 26a and 26h
		h. Tube fittings	Remove caps, connect to control valve and tighten	Para 2-56f(1), steps 26c and 26k
		i. Control valve linkage	Connect	Para 2-56b, step 15c

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

a. Control Valve (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
56	Front of vehicle, control valve	Elbows and hose fittings	Install, remove caps, connect to control valve and tighten	Para 2-56f(1), step 25
57		Hydraulic reservoir	Fill with hydraulic oil	Para 2-56g(1)
58	Operator's compartment		Perform paragraph 2-56f(1), step 27	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies.

This task covers:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection/Repair
e. Reassembly
f. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Chain Hoist, 1/2 ton capacity	
Sleeve, 1-1/2 inches diameter	
Sleeve, 1-9/16 inches diameter	

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Seal repair kit
Clean hydraulic oil (refer to current lubrication order)
Medium grit emery cloth

EQUIPMENT CONDITION

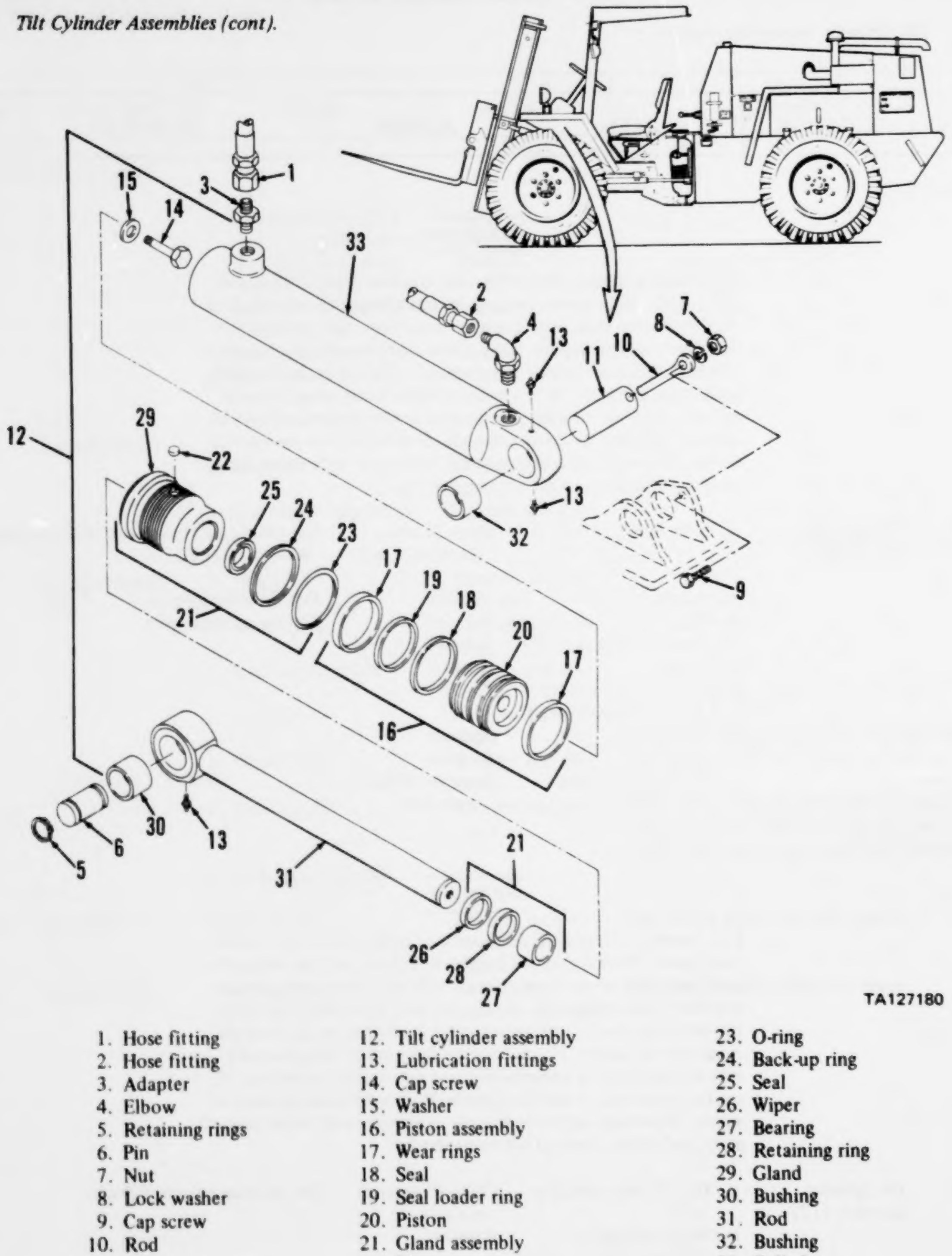
Paragraph	**Condition Description**
	Vehicle parked on level surface, engine off, parking brake applied, mast vertical and forks lowered and resting on ground. Control valve control levers operated several times to relieve hydraulic pressure.

WARNING

If both tilt cylinder assemblies are to be removed, support mast assembly using chain hoist attached to top of mast assembly. Failure to do so may cause mast assembly to fall forward, striking personnel standing/working in front of unit. This could cause serious injury or death.

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).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TA127180

1. Hose fitting
2. Hose fitting
3. Adapter
4. Elbow
5. Retaining rings
6. Pin
7. Nut
8. Lock washer
9. Cap screw
10. Rod
11. Pin
12. Tilt cylinder assembly
13. Lubrication fittings
14. Cap screw
15. Washer
16. Piston assembly
17. Wear rings
18. Seal
19. Seal loader ring
20. Piston
21. Gland assembly
22. Plug
23. O-ring
24. Back-up ring
25. Seal
26. Wiper
27. Bearing
28. Retaining ring
29. Gland
30. Bushing
31. Rod
32. Bushing
33. Cylinder

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
1	Vehicle side, left or right	a. Hose fitting (1 and 2)	Clean, loosen, disconnect and cap	Use clean cloth moistened with cleaning solvent P-D-680
		b. Adapter (3)	Remove	Cap tilt cylinder port
		c. Elbow (4)	Remove	Cap tilt cylinder port
		d. Two retaining rings (5)	Remove	
		e. Pin (6)	Remove	
		f. Nut (7), lock washer (8), and cap screw (9)	Remove	
		g. Rod (10)	Remove	
		h. Pin (11)	Remove	
		i. Tilt cylinder assembly (12)	Remove to clean work area	
DISASSEMBLY				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2	Tilt cylinder assembly (12)	a. Tilt cylinder assembly (12)	Clean all exterior surfaces	Use cleaning solvent P-D-680
		b. Three lubrication fittings (13)	Remove	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
2 (cont)		c. Gland assembly (21)	Loosen	
		d. Rod (31), gland assembly (21), and piston assembly (16)	Remove as an assembly	
		e. Cap screw (14) and washer (15)	Remove	
		f. Piston assembly (16)	Remove	
		g. Gland assembly (21)	Remove	
3	Piston assembly (16)	a. Two wear rings (17)	Remove and discard	
		b. Seal (18)	Remove and discard	
		c. Seal loader ring (19)	Remove and discard	
4	Gland assembly (21)	a. Plug (22)	Remove only if damaged	
		b. O-ring (23)	Remove and discard	
		c. Back-up ring (24)	Remove and discard	
		d. Seal (25)	Remove and discard	
		e. Wiper (26)	Remove and discard	
		f. Bearing (27)	Remove and discard	Use 1-1/2 inches diameter sleeve; remove from rod end. Bearing (27) and ring (28) will both be removed
		g. Retaining ring (28)	Remove	
5	Rod (31)	Bushing (30)	Remove only if worn or damaged	Use 1-9/16 inches diameter sleeve
6	Cylinder (33)	Bushing (32)	Remove only if worn or damaged	Use 1-9/16 inches diameter sleeve

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
7		All parts	Clean	Use cleaning solvent P-D-680; dry with compressed air
INSPECTION/REPAIR				
8		Rod (31)	Inspect	Replace if bent, deeply grooved, or scored. Remove nicks or scratches with medium grit emery cloth polishing with a rotary motion
9		Cylinder (33)	Inspect	Replace if deeply grooved, scored, or damaged. Remove nicks or scratches inside cylinder with medium grit emery cloth polishing with a rotary motion
10		Bushing (30 and 32)	Inspect	Replace if worn, cracked or split
11		All other parts	Inspect	Replace if damaged, cracked, split, grooved or scored
REASSEMBLY				
12	Cylinder (33)	Bushing (32)	Install	Use 1-9/16 inches diameter sleeve; install until flush
13	Rod (31)	Bushing (30)	Install	Use 1-9/16 inches diameter sleeve; install until flush

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
14	Gland (29)	a. Bearing (27)	Install from rod end	Butt against shoulder of gland (29)
		b. Retaining ring (28)	Install from rod end; chamfer towards bearing (27)	Butt against bearing (27)
		c. Wiper (26)	Install	Grooved side towards rod end
		d. Seal (25)	Install	Seal lip towards cylinder
		e. Back-up ring (24)	Install	Curved side towards O-ring (23)
		f. O-ring (23)	Install	
		g. Plug (22)	Install	
15	Piston (20)	a. Seal loader ring (19)	Install	
		b. Seal (18)	Install	On seal loader ring (19)
		c. Two wear rings (17)	Install	
		CAUTION Use extreme care when performing following step not to damage wiper, seal, back-up rings or O-ring.		
16	Rod (31)	a. Gland assembly (21)	Lubricate and slide on rod (31)	Use clean hydraulic oil (refer to current lubrication order)
		b. Piston assembly (16)	Slide on rod (31)	Small diameter recess towards rod (31)
		c. Washer (15) and cap screw (14)	Install	Tighten to 200-220 pounds foot torque
		d. Seal (18)	Lubricate	Use clean hydraulic oil (refer to current lubrication order)
		CAUTION Use extreme care not to damage rings or seals when performing following step.		
17	Cylinder (33)	a. Rod (31), gland assembly (21), and piston assembly (16)	Install as an assembly	
		b. Gland assembly (21)	Position and tighten	Tighten to 150-200 pounds foot torque
		c. Three lubrication fittings (13)	Install	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

b. Tilt Cylinder Assemblies (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT				
18	Vehicle side, left or right	a. Tilt cylinder assembly (12)	Position	
		b. Pin (11)	Install	
		c. Rod (10)	Install	
		d. Cap screw (9), lock washer (8), and nut (7)	Install	
		e. Pin (6)	Install	
		f. Two retaining rings (5)	Install	
		g. Elbow (4)	Install	
		h. Adapter (3)	Install	
		i. Hose fitting (1 and 2)	Remove caps, connect and tighten	
19	Operator's compartment		Perform paragraph 2-56f(2), step 12	
20	Tilt cylinder assembly	Three lubrication fittings	Lubricate	Refer to current lubrication order

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection/Repair
- e. Reassembly
- f. Testing
- g. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hydraulic Pump (used for testing)

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Seal repair kit
Clean hydraulic oil (refer to current lubrication order)
Medium grit emery cloth

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, mast vertical, and forks resting on ground.
	Control valve control levers operated several times to relieve hydraulic pressure.
	Forks shifted to extreme right.
2-56e	One end of sideshift chains disconnected from carriage and pulleys removed from sideshift cylinder assembly.

REMOVAL

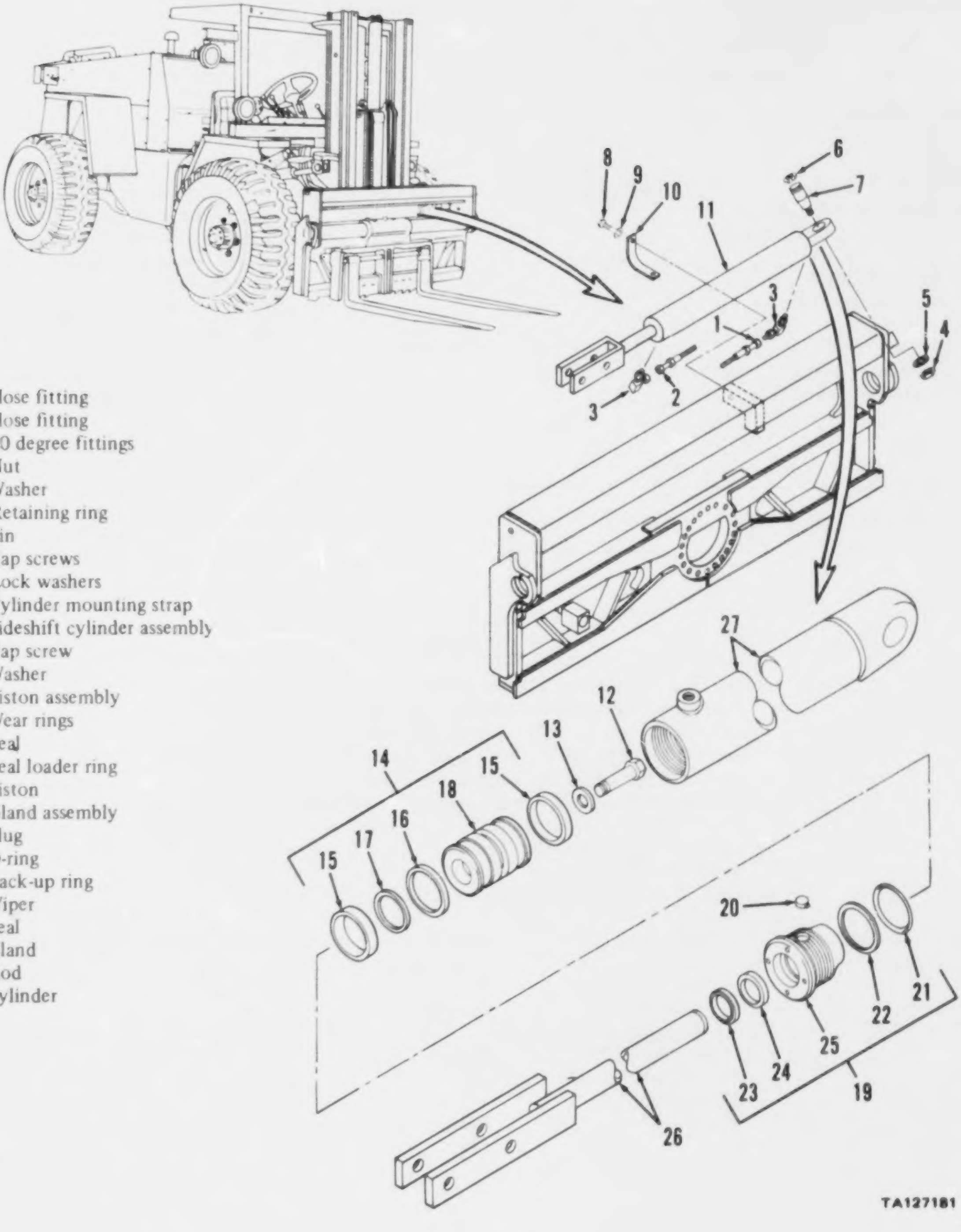
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Mast assembly, front	a. Hose fitting (1 and 2)	Clean, loosen, disconnect and cap	Use cleaning solvent P-D-680
		b. Two 90 degree fittings (3)	Remove	
		c. Nut (4), washer (5), and retaining ring (6)	Remove	
		d. Pin (7)	Remove	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).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KEY

1. Hose fitting
2. Hose fitting
3. 90 degree fittings
4. Nut
5. Washer
6. Retaining ring
7. Pin
8. Cap screws
9. Lock washers
10. Cylinder mounting strap
11. Sideshift cylinder assembly
12. Cap screw
13. Washer
14. Piston assembly
15. Wear rings
16. Seal
17. Seal loader ring
18. Piston
19. Gland assembly
20. Plug
21. O-ring
22. Back-up ring
23. Wiper
24. Seal
25. Gland
26. Rod
27. Cylinder

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
1 (cont)		**CAUTION** Support sideshift cylinder assembly while performing following step to prevent it from falling.		
		e. Two cap screws (8) and lock washers (9)	Remove	
		f. Cylinder mounting strap (10)	Remove	
		g. Sideshift cylinder assembly (11)	Remove by pulling out from side of carriage assembly	
DISASSEMBLY				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
2	Sideshift cylinder assembly (11)	a. Sideshift cylinder assembly (11)	Clean all exterior surfaces	Use cleaning solvent P-D-680
		b. Gland assembly (19)	Loosen	
		c. Rod (26), gland assembly (19), and piston assembly (14)	Remove as an assembly	
		d. Cap screw (12) and washer (13)	Remove	
		e. Piston assembly (14)	Remove	
		f. Gland assembly (19)	Remove	
3	Piston assembly (14)	a. Two wear rings (15)	Remove and discard	
		b. Seal (16)	Remove	
		c. Seal loader ring (17)	Remove and discard	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
4	Gland assembly (19)	a. Plug (20)	Remove only if damaged	
		b. O-ring (21)	Remove and discard	
		c. Back-up ring (22)	Remove and discard	
		d. Wiper (23)	Remove and discard	
		e. Seal (24)	Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680, used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
5		All parts	Clean	Use cleaning solvent P-D-680; dry with compressed air
INSPECTION/REPAIR				
6		Rod (26)	Inspect	Replace if bent, deeply grooved, or scored. Remove nicks or scratches with medium grit emery cloth polishing with a rotary motion
7		Cylinder (27)	Inspect	Replace if deeply grooved, scored or nicked, or damaged. Remove nicks or scratches inside cylinder with medium grit emery cloth polishing with a rotary motion

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR (cont)				
8		All other parts	Inspect	Replace if damaged, cracked, split, grooved, or scored
REASSEMBLY				
9	Gland (25)	a. Seal (24)	Install	Seal lip towards cylinder
		b. Wiper (23)	Install	Lip towards rod
		c. Back-up ring (22)	Install	Curved side towards O-ring (21)
		d. O-ring (21)	Install	
		e. Plug (20)	Install	
10	Piston (18)	a. Seal loader ring (17)	Install	
		b. Seal (16)	Install	On seal loader ring (17)
		c. Two wear rings (15)	Install	
		CAUTION Use care when performing following step not to damage seal or wiper.		
11	Rod (26)	a. Gland assembly (19)	Lubricate and slide on rod (26)	Use clean hydraulic oil (refer to current lubrication order)
		b. Piston assembly (14)	Slide on rod (26)	Small diameter recess towards rod (26)
		c. Washer (13) and cap screw (12)	Install	Tighten to 200-220 pounds foot torque
		d. Seal (16)	Lubricate	Use clean hydraulic oil (refer to current lubrication order)
		CAUTION Use extreme care not to damage rings or seals when performing following step.		
12	Cylinder (27)	a. Rod (26), gland assembly (19), and piston assembly (14)	Install as an assembly	
		b. Gland assembly (19)	Position and tighten	Tighten to 150-200 pounds foot torque
TESTING				
13	Sideshift cylinder assembly	Cylinder port (port opposite rod end)	a. Connect hydraulic hose to port (hose must have a 7/16-20 fitting on end) b. Connect other end of hose to test hydraulic pump	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
14	Test hydraulic pump		a. Start pump and apply hydraulic oil under pressure (2000 PSI) to sideshift cylinder assembly b. Continue operating pump until rod is completely extended from cylinder; hold until step 15 below is completed	Rod should extend smoothly from cylinder
15	Sideshift cylinder assembly	a. Rod end port	Check for hydraulic oil leakage	Slight weepage of oil is permissible; if leakage is too great, disassemble cylinder and check piston assembly (14) for damage
		b. Rod end packing	Check for hydraulic oil leakage	If leakage is observed, disassemble cylinder and check gland assembly (19) for damage
16	Test hydraulic pump		Shut pump down	
17	Sideshift cylinder assembly	a. Cylinder port (port opposite rod end)	Disconnect hydraulic hose and drain oil from cylinder	Push rod into cylinder
		b. Both cylinder ports	Cap	Prevents intrusion of dirt
INSTALLATION/REPLACEMENT				
18	Mast assembly, front	a. Sideshift cylinder assembly (11) b. Cylinder mounting strap (10) c. Two cap screws (8) and lock washers (9) d. Pin (7) e. Retaining ring (6), washer (5), and nut (4)	Position on carriage Position Install Install Install	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

c. Sideshift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
18 (cont)		f. Two 90 degree fittings (3) g. Hose fittings (1 and 2)	Install Remove caps, connect and tighten	
19	Operator's compartment			Perform paragraph 2-56f(2), step 12

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection/Repair
- e. Reassembly
- f. Testing
- g. Installation/Replacement

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Chain Hoist, 1/2 ton capacity	
Sleeve, 1-5/8 inches diameter	
Hydraulic Pump (used for testing)	

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Seal repair kit
Clean hydraulic oil (refer to current lubrication order)
Medium grit emery cloth

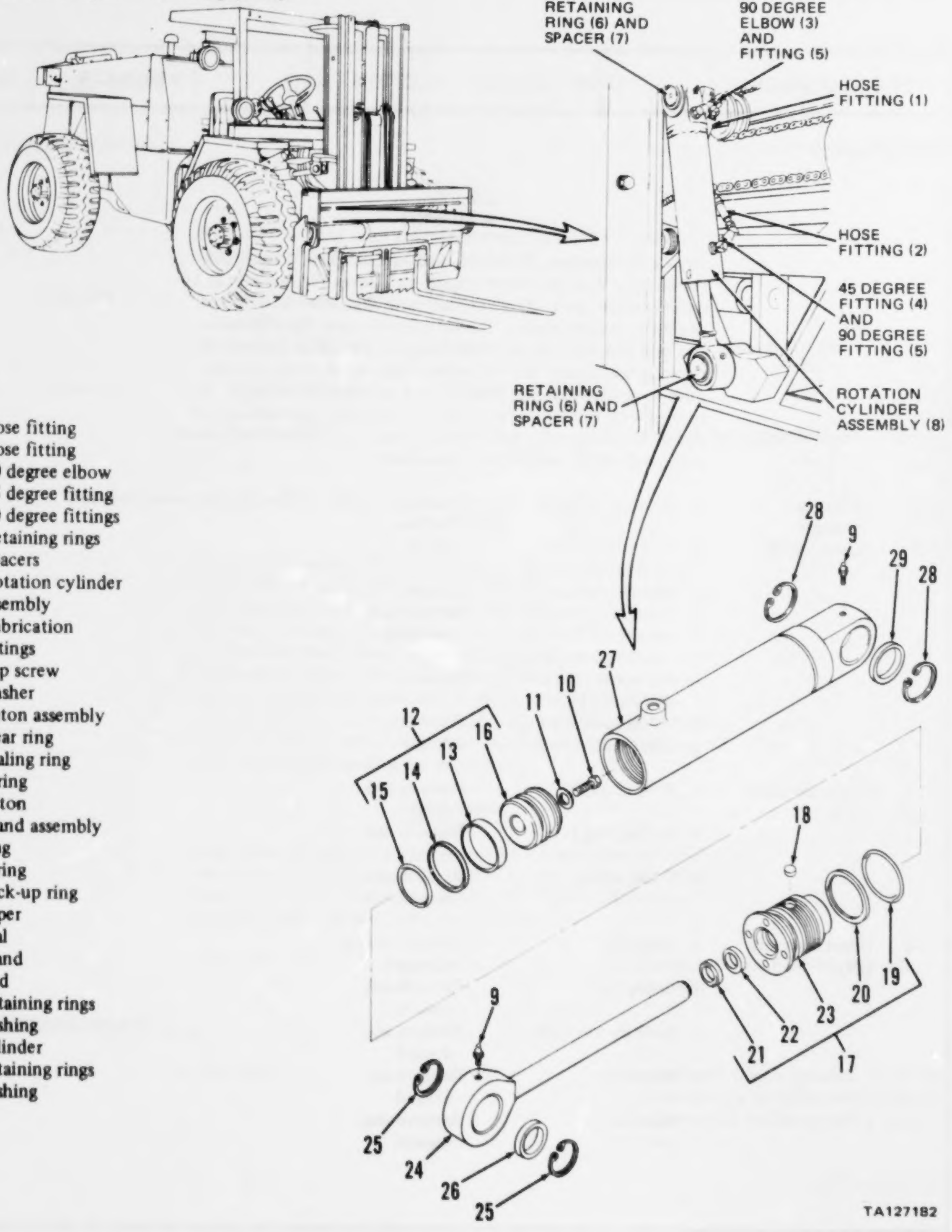
EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, mast vertical, and forks resting on ground.
	Control valve control levers operated several times to relieve hydraulic pressure.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
1	Mast assembly, rear	a. Hose fitting (1 and 2)	Clean, loosen, disconnect and cap	Use cleaning solvent P-D-680
		b. 90 degree elbow (3)	Remove	
		c. 45 degree fitting (4)	Remove	
		d. Two 90 degree fittings (5)	Remove	Plug rotation cylinder assembly ports
		e. Two retaining rings (6) and spacers (7)	Remove	
		f. Rotation cylinder assembly (8)	Remove to clean work area	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).


RETAINING RING (6) AND SPACER (7)
90 DEGREE ELBOW (3) AND FITTING (5)
HOSE FITTING (1)
HOSE FITTING (2)
45 DEGREE FITTING (4) AND 90 DEGREE FITTING (5)
RETAINING RING (6) AND SPACER (7)
ROTATION CYLINDER ASSEMBLY (8)
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KEY

1. Hose fitting
2. Hose fitting
3. 90 degree elbow
4. 45 degree fitting
5. 90 degree fittings
6. Retaining rings
7. Spacers
8. Rotation cylinder assembly
9. Lubrication fittings
10. Cap screw
11. Washer
12. Piston assembly
13. Wear ring
14. Sealing ring
15. O-ring
16. Piston
17. Gland assembly
18. Plug
19. O-ring
20. Back-up ring
21. Wiper
22. Seal
23. Gland
24. Rod
25. Retaining rings
26. Bushing
27. Cylinder
28. Retaining rings
29. Bushing

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Rotation cylinder assembly (8)	a. Rotation cylinder assembly (8)	Clean all exterior surfaces	Use cleaning solvent P-D-680
		b. Two lubrication fittings (9)	Remove	
		c. Gland assembly (17)	Loosen	
		d. Rod (24), gland assembly (17), and piston assembly (12)	Remove as an assembly	
		e. Cap screw (10) and washer (11)	Remove	
		f. Piston assembly (12)	Remove	
		g. Gland assembly (17)	Remove	
3	Piston assembly (12)	a. Wear ring (13)	Remove and discard	
		b. Sealing ring (14)	Remove and discard	
		c. O-ring (15)	Remove and discard	
4	Gland assembly (17)	a. Plug (18)	Remove only if damaged	
		b. O-ring (19)	Remove and discard	
		c. Back-up ring (20)	Remove and discard	
		d. Wiper (21)	Remove and discard	
		e. Seal (22)	Remove and discard	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
		NOTE Perform following steps only if inspection indicates replacement of bushings (26 and 29) is necessary.		
5	Rod (24)	a. Two retaining rings (25)	Remove	
		b. Bushing (26)	Remove	Use 1-5/8 inches diameter sleeve
6	Cylinder (27)	a. Two retaining rings (28)	Remove	
		b. Bushing (29)	Remove	Use 1-5/8 inches diameter sleeve
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
7		All parts	Clean	Use cleaning solvent P-D-680; dry with compressed air
INSPECTION/REPAIR				
8		Rod (24)	Inspect	Replace if bent, deeply grooved, or scored. Remove nicks or scratches with medium grit emery cloth polishing with a rotary motion

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR (cont)				
9		Cylinder (27)	Inspect	Replace if deeply grooved, scored or nicked, or damaged. Remove nicks or scratches inside cylinder with medium grit emery cloth polishing with a rotary motion
10		Bushing (26 and 29)	Inspect	Replace if damaged, worn, cracked, or split
11		All other parts	Inspect	Replace if damaged, cracked, split, grooved or scored
REASSEMBLY				
12	Cylinder (27)	a. Bushing (29)	Install	Use 1-5/8 inches diameter sleeve; install until centered
		b. Two retaining rings (28)	Install	
13	Rod (24)	a. Bushing (26)	Install	Use 1-5/8 inches diameter sleeve; install until centered
		b. Two retaining rings (25)	Install	
14	Gland (23)	a. Seal (22)	Install	Seal lip towards cylinder
		b. Wiper (21)	Install	Lip towards rod
		c. Back-up ring (20)	Install	Curved side towards O-ring (19)
		d. O-ring (19)	Install	
		e. Plug (18)	Install	
15	Piston (16)	a. O-ring (15)	Install	
		b. Sealing ring (14)	Install	On O-ring (15)
		c. Wear ring (13)	Install	

CAUTION

Use care when performing following step not to damage parts.

STEP	LOCATION	ITEM	ACTION	REMARKS
16	Rod (24)	a. Gland assembly (17)	Lubricate and slide on rod	Use clean hydraulic oil (refer to current lubrication order)
		b. Piston assembly (12)	Slide on rod	Small diameter recess towards rod (24)
		c. Washer (11) and cap screw (10)	Install	Tighten to 90-100 pounds foot torque
		d. Sealing ring (14)	Lubricate	Use clean hydraulic oil (refer to current lubrication order)

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
		CAUTION Use extreme care not to damage rings or seals when performing following step.		
17	Cylinder (27)	a. Rod (24), gland assembly (17) and piston assembly (12)	Install as an assembly	
		b. Gland assembly (17)	Position and tighten	Tighten to 100-150 pounds foot torque
18	Rotation cylinder assembly (8)	Two lubrication fittings (9)	Install	
TESTING				
19	Rotation cylinder assembly	Cylinder port (port opposite rod end)	a. Connect hydraulic hose to port (hose must have a 7/16-20 fitting on end) b. Connect other end of hose to test hydraulic pump	
20	Test hydraulic pump		a. Start pump and apply hydraulic oil under pressure (2000 PSI) to rotation cylinder assembly b. Continue operating pump until rod is completely extended from cylinder; hold until step 21 below is completed	Rod should extend smoothly from cylinder

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

d. Rotation Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
21	Steering cylinder assembly	a. Rod end port	Check for hydraulic oil leakage	Slight weepage of oil is permissible; if leakage is too great, disassemble cylinder and check piston assembly (12) for damage
		b. Rod end packing	Check for hydraulic oil leakage	If leakage is observed, disassemble cylinder and check gland assembly (17) for damage
22	Test hydraulic pump			Shut pump down
23	Steering cylinder assembly	a. Cylinder port (port opposite rod end)	Disconnect hydraulic hose and drain oil from cylinder	Push rod into cylinder
		b. Both cylinder ports	Cap	Prevents intrusion of dirt
INSTALLATION/REPLACEMENT				
24	Mast assembly, rear	a. Rotation cylinder assembly (8)	Position on carriage mounting pins	
		b. Two spacers (7) and retaining rings (6)	Install	
		c. Two 90 degree fittings (5)	Install	
		d. 45 degree fitting (4)	Install	
		e. 90 degree elbow (3)	Install	
		f. Hose fitting (1 and 2)	Remove caps, connect and tighten	
25	Operator's compartment		Perform paragraph 2-56f(2), step 12	
26	Rotation cylinder	Two lubrication fittings	Lubricate	Refer to current lubrication order

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly

This task covers:		
	a. Removal	d. Inspection/Repair
	b. Disassembly	e. Reassembly
	c. Cleaning	f. Installation/Replacement

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Chain Hoists, two, 1/2 ton capacity each
Brass jaw vise and support stand
Hard Wooden Blocks (2), 6 by 6 by 12 inches
Container, six gallon capacity
Insertion sleeve, external taper (FSCM 45225 P/N CAS1704-1)
Insertion sleeve, internal taper (FSCM 45225 P/N CAS1704-2)
Spanner wrench NSN 5120-00-277-9077 , NSN 5120-00-277-9076

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Seal repair kit
Clean hydraulic oil (refer to current lubrication order)
Medium grit emery cloth

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, parking brake applied, mast vertical, and carriage assembly raised one foot from ground and securely blocked. Control valve control levers operated several times to relieve hydraulic pressure.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				

WARNING

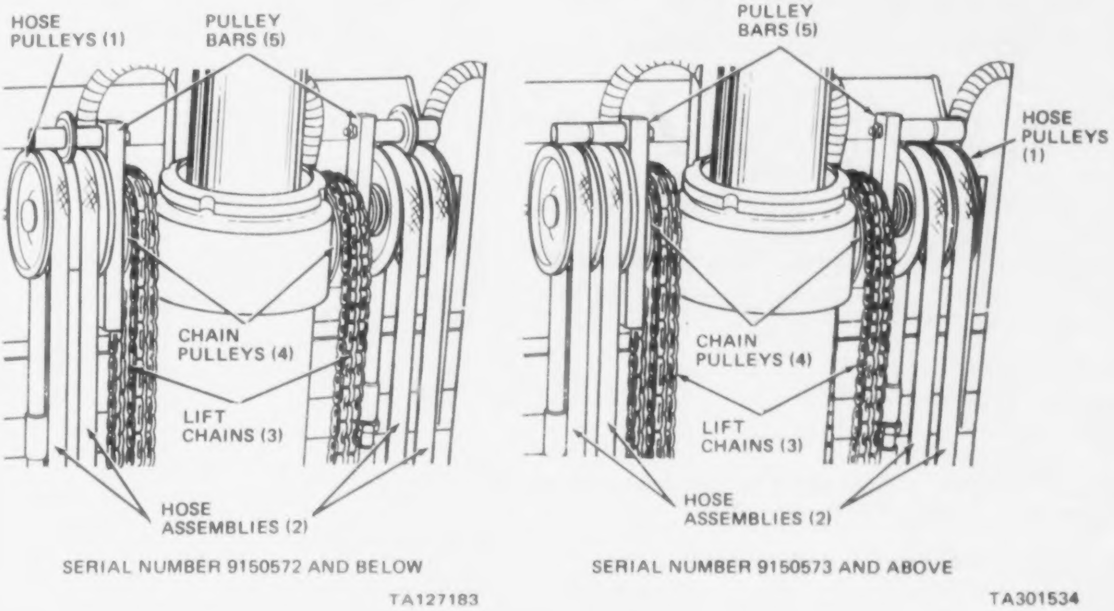
Hydraulic system is under pressure. Before disconnecting any hoses, lines, or fittings, operate all hydraulic lift control levers to relieve hydraulic system pressure. Failure to do so could cause serious injury or death.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Lift cylinder	a. Two hose pulleys (1)	Remove	Para 2-56d, steps 2f thru 2j
		b. Four hose assemblies (2)	Position out of way	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				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HOSE PULLEYS (1)
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HOSE ASSEMBLIES (2)
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TA301534

SERIAL NUMBER 9150572 AND BELOW

SERIAL NUMBER 9150573 AND ABOVE

STEP	LOCATION	ITEM	ACTION	REMARKS
1 (cont)		c. Two lift chains (3)	Position out of way	
		d. Two chain pulleys (4) and pulley bars (5)	Remove	Para 2-56d, steps 2k thru 2n
2	Mast assembly top	a. Safety wire (6)	Remove and discard	
		b. Two cap screws (7), washers (8), spacers (9), and washers (10)	Remove	
3	Inner mast	Chain hoist	a. Attach to top of inner mast b. Raise inner mast 20 inches	
4	Lift cylinder assembly (11)	Chain hoist	Attach to lift cylinder assembly under chain trunnion roller spacers using nylon straps	

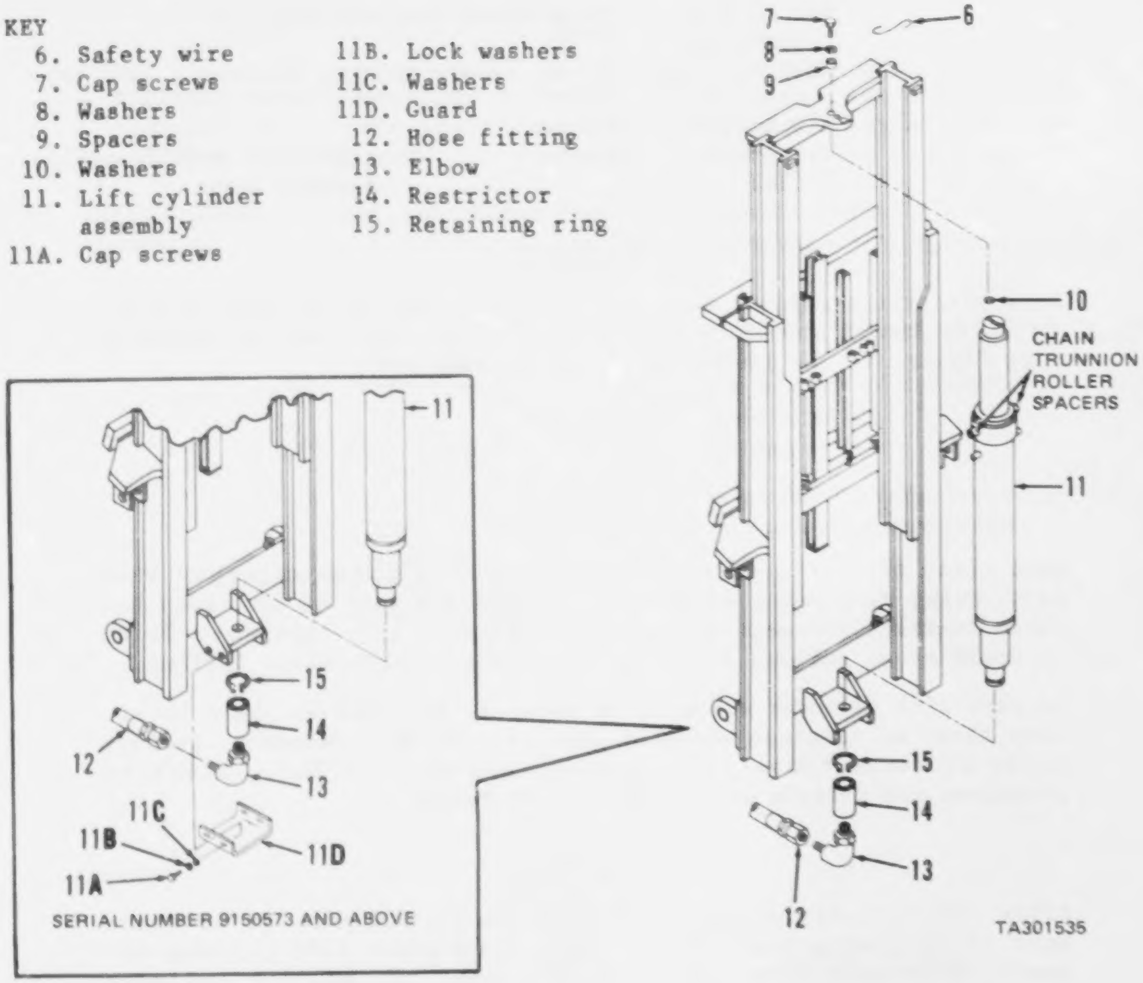
3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

REMOVAL (cont)

KEY

6. Safety wire	11B. Lock washers
7. Cap screws	11C. Washers
8. Washers	11D. Guard
9. Spacers	12. Hose fitting
10. Washers	13. Elbow
11. Lift cylinder assembly	14. Restrictor
11A. Cap screws	15. Retaining ring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CHAIN TRUNNION ROLLER SPACERS
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SERIAL NUMBER 9150573 AND ABOVE
TA301535

STEP	LOCATION	ITEM	ACTION	REMARKS
5	Mast assembly, bottom	a. Four cap screws (11A), lock washers (11B), and washers (11C)	Loosen and remove	Serial numbers 9150573 and above
		b. Guard (11D)	Remove	Serial numbers 9150573 and above

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
5 (cont)		c. Six gallon container	Place under hose fitting (12)	
		d. Hose fitting (12)	Clean, slowly loosen, disconnect and cap	
		e. Elbow (13)	Remove	
		f. Restrictor (14)	Remove	Install plug in lift cylinder assembly port

WARNING

Wear protective goggles when performing the following step. Failure to do so could cause blindness or serious injury due to retaining ring flying off its groove and striking your eye.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Retaining ring (15)	Remove	

WARNING

Keep clear of carriage assembly and lift cylinder assembly when performing following step. Don't place any part of your body between carriage and mast assemblies or beneath lift cylinder. To do so could cause serious injury or death due to jack stand falling.

Be sure lift cylinder assembly is securely fastened to chain hoist. Keep clear of carriage assembly and lift cylinder assembly. Failure to do so could cause lift cylinder assembly to fall, striking personnel and causing serious injury or death.

NOTE

After lift cylinder assembly has cleared bottom portion of inner mast in following step, hold a clean cloth under lift cylinder assembly to prevent inner tube from extending out of lift cylinder assembly.

STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Lift cylinder assembly (11)	Slowly raise	Check that inner tube of lift cylinder assembly is not extending out from bottom of lift cylinder assembly. If inner tube of lift cylinder assembly is extending out from bottom of lift cylinder assembly, use suitable device or tool to compress it

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

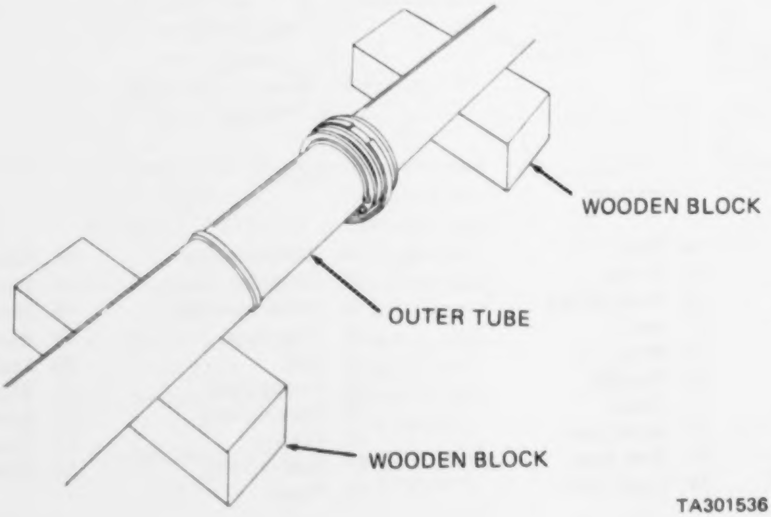
e. Lift Cylinder Assembly (cont).

DISASSEMBLY

NOTE

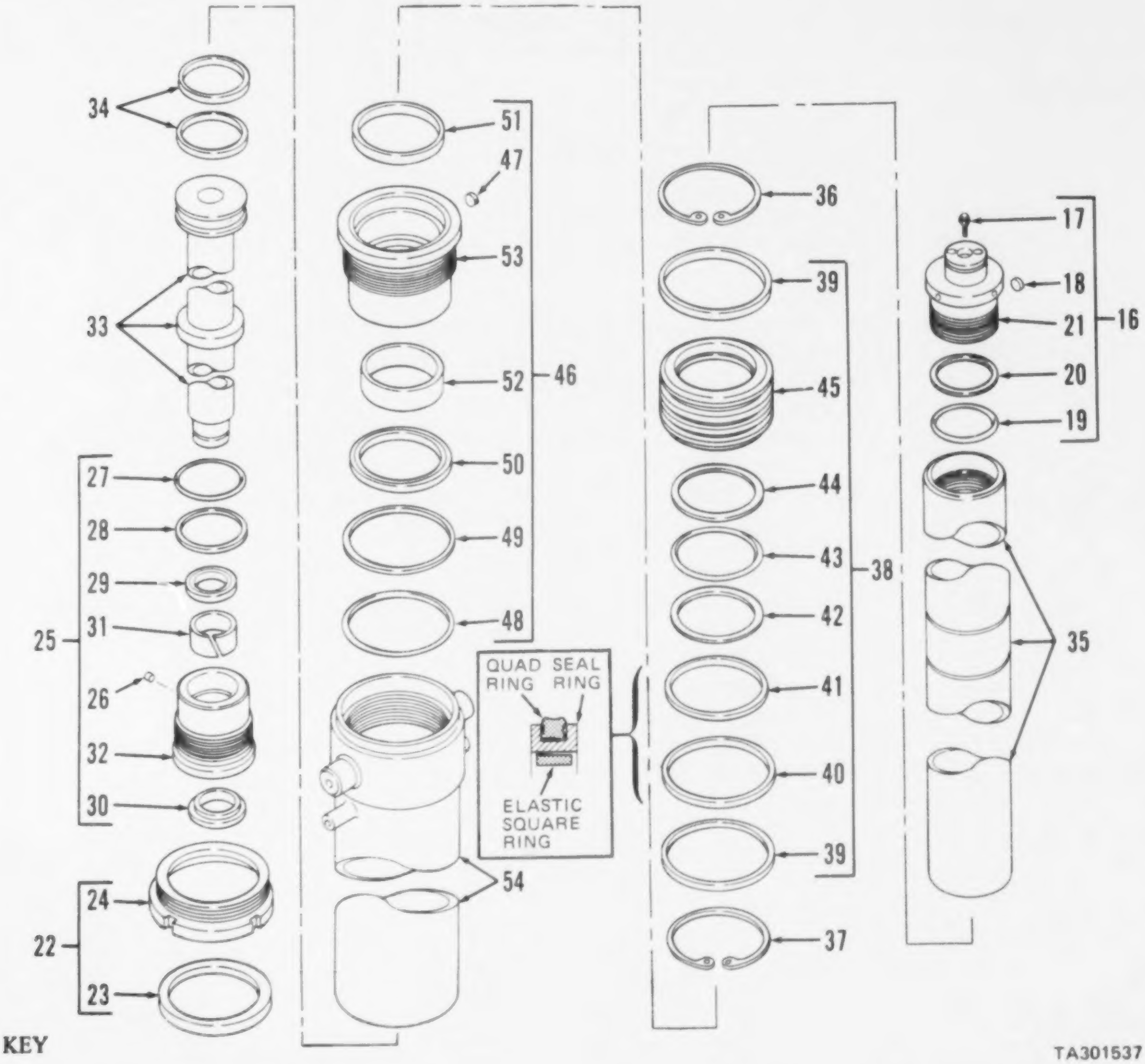
Position outer tube (35) in brass jaw vise (or use wood blocks between vise jaws and outer tube); support other end of lift cylinder assembly.

STEP	LOCATION	ITEM	ACTION	REMARKS
6	Lift cylinder assembly (11)	a. End cap assembly (16)	Position container beneath, then remove	Use Spanner Wrench NSN 5120-00-277-9076
		b. Ring assembly (22)	Remove	
		c. Gland assembly (25)	Remove	Use Spanner Wrench NSN 5120-00-277-9077
		d. Inner tube (33)	Pull out from bottom of cylinder (54) and remove	
		e. Gland assembly (46)	Remove	
		f. Outer tube (35), retaining rings (36 and 37) and piston assembly (38)	Remove as an assembly from top of cylinder (54) and place on wooden blocks	



3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).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35
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KEY

16. End cap assembly
17. Bleed screw
18. Plug
19. O-ring
20. Back-up ring
21. End cap
22. Ring assembly
23. Wiper
24. Ring
25. Gland assembly
26. Plug
27. O-ring
28. Back-up ring
29. Seal
30. Wiper
31. Bearing
32. Gland
33. Inner tube
34. Wear rings
35. Outer tube
36. Retaining ring
37. Retaining ring
38. Piston assembly
39. Wear rings
40. Seal
41. Loader ring
42. Back-up ring
43. O-ring
44. Back-up ring
45. Piston
46. Gland assembly
47. Plug
48. O-ring
49. Back-up ring
50. Seal
51. Wiper
52. Bearing
53. Gland
54. Cylinder

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
7	End cap assembly (16)	a. Bleed screw (17)	Remove	
		b. Plug (18)	Remove	Only if damaged
		c. O-ring (19)	Remove and discard	
		d. Back-up ring (20)	Remove and discard	
8	Ring assembly (22)	Wiper (23)	Remove and discard	
9	Gland assembly (25)	a. Plug (26)	Remove and discard	
		b. O-ring (27)	Remove and discard	
		c. Back-up ring (28)	Remove and discard	
		d. Seal (29)	Remove and discard	
		e. Wiper (30)	Remove and discard	
		f. Bearing (31)	Remove and discard	
10	Inner tube (33)	Two wear rings (34)	Remove and discard	
11	Outer tube (35)	a. Retaining rings (36 and 37)	Remove	
		b. Piston assembly (38)	Remove	
12	Piston assembly (38)	a. Two wear rings (39)	Remove and discard	
		b. Seal (40)	Remove and discard	
		c. Loader ring (41)	Remove and discard	
		d. Back-up ring (42)	Remove and discard	
		e. O-ring (43)	Remove and discard	
		f. Back-up ring (44)	Remove and discard	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (CONT)				
13	Gland assembly (46)	a. Plug (47)	Remove and discard	
		b. O-ring (48)	Remove and discard	
		c. Back-up ring (49)	Remove and discard	
		d. Seal (50)	Remove and discard	
		e. Wiper (51)	Remove and discard	
		f. Bearing (52)	Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent P-D-680 used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes and don´t breathe vapors. Do not use near open flame or excessive heat and don´t smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air and medical attention immediately. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water and get medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
14		All parts	Clean	Use cleaning solvent P-D-680; dry with compressed air

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR				
15		Tubes (33 and 35)	Inspect	Replace if bent, deformed, deeply grooved, or scored. Remove nicks or scratches with medium grit emery cloth polishing with a rotary motion
16		Cylinder (54)	Inspect	Replace if cracked, or deeply grooved or scored. Remove nicks or scratches with medium grit emery cloth polishing with a rotary motion
17		All other parts	Inspect	Replace if damaged, cracked, split, grooved or scored
REASSEMBLY				
18	Gland (53)	a. Bearing (52)	Install	
		b. Wiper (51)	Install	Lip outwards
		c. Seal (50)	Install	Lip outwards
		d. Back-up ring (49)	Install	Curved side towards O-ring (48)
		e. O-ring (48)	Install	
		f. Plug (47)	Install	
19	Piston (45)	a. Back-up ring (44)	Install	
		b. O-ring (43)	Install	
		c. Back-up ring (42)	Install	

NOTE

Loader ring (41) is not used when seal repair kit is installed. Loader ring is replaced by three-piece seal (40) supplied with seal repair kit.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Two wear rings (39)	Install	
20	Gland (32)	a. Bearing (31)	Install	
		b. Wiper (30)	Install	Lip outwards

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
20 (cont)		c. Seal (29)	Install	Lip outwards
		d. Back-up ring (28)	Install	Curved side towards O-ring (27)
		e. O-ring (27)	Install	
		f. Plug (26)	Install	
21	Inner tube (33)	Two wear rings (34)	Install	Side-by-side in groove
22	Ring (24)	Wiper (23)	Install	Lip outwards
23	End cap (21)	a. Back-up ring (20)	Install	Curved side towards O-ring (19)
		b. O-ring (19)	Install	
		c. Plug (18)	Install	
		d. Bleed screw (17)	Install	
24	Outer tube (35)	a. Retaining ring (37)	Install	Be sure ring is seated in its groove

CAUTION

Be careful not to damage back-up rings (42 and 44) or O-ring (43) when performing the following step. Exercise extreme care when using tools CAS1704-1 and CAS1704-2; they are fragile.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Piston assembly (38)	Lubricate and slide on tube (35)	Use clean hydraulic oil (refer to current lubrication order)
		c. Retaining ring (36)	Install	Be sure ring is seated in its groove
		d. Tool CAS1704-1	a. Apply hydraulic oil to all surfaces	

NOTE

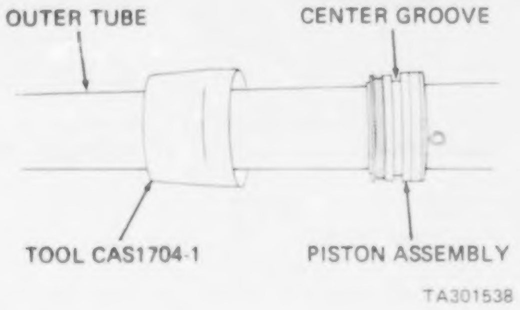
It may be necessary to remove bottom wear ring (39) when performing following step.

STEP	LOCATION	ITEM	ACTION	REMARKS
			b. Install on outer tube (35) as shown. Large end of tool positioned over piston assembly (38). Rotate tool until small notch inside of tool covers ears of retaining ring (37): tool should then be flush with center groove of piston assembly (38)	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

REASSEMBLY (cont)



STEP	LOCATION	ITEM	ACTION	REMARKS
24 (cont)		e. New seal (40)	Separate elastic square ring from seal ring if not already separated	
		f. Elastic square ring	a. Liberally apply hydraulic oil b. Slide over tool CAS1704-1 c. Install in center groove of piston assembly (38). Use finger tips and slow, even pressure to pull ring over tool until ring falls into position in center groove	
		g. Seal ring	a. Liberally apply hydraulic oil b. Slide over tool CAS1704-1 c. Install in center groove of piston assembly (38). Use finger tips and slow, even pressure to pull seal ring over tool until ring falls into position in center groove over elastic square ring	
		h. Tool CAS1704-1	Remove	From outer tube (35)
		i. Bottom wear ring (39)	Install	If removed
24A	Outer tube (35)	a. Inner tube (33)	Lubricate and install	Use clean hydraulic oil (refer to current lubrication order)
		b. Gland assembly (25)	Lubricate, slide on inner tube (33), connect to outer tube (35) and tighten	Use clean hydraulic oil (refer to current lubrication order). Tighten after metal-to-metal contact

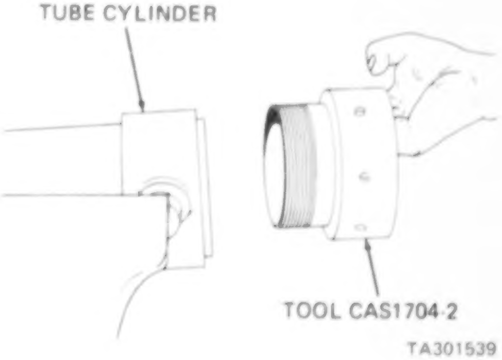
3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
24A (cont)		c. End cap assembly (16)	Lubricate, and install	Use clean hydraulic oil (refer to current lubrication order). Tighten after metal-to-metal contact
25	Cylinder (54)	a. Tool CAS1704-2	a. Install in tube cylinder and hand tighten; use of spanner wrench may be necessary	

NOTE

If tool CASi704-2 cannot be completely installed in cylinder (54), cylinder may be distorted due to too much pressure exerted by vise. Loosen vise grip on cylinder then repeat step 25a above.



STEP	LOCATION	ITEM	ACTION	REMARKS
			b. Lubricate	Use clean hydraulic oil (refer to current lubrication order)
		b. Inner tube (33)	Pull completely out of outer tube (35) until it bottoms in outer tube	

CAUTION

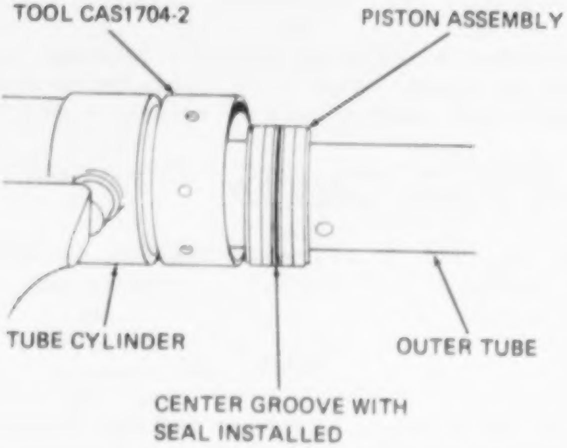
When performing following steps, be careful not to damage parts.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Inner tube (33) and outer tube (35)	a. With an assistant, slowly install through tool CAS1704-2 and top of cylinder (54) until piston assembly is inside tool CAS1704-2	

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

REASSEMBLY (cont)



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STEP	LOCATION	ITEM	ACTION	REMARKS
25 (cont)		c. Inner tube (33) and outer tube (35) (cont)	b. Hold outer tube (35) firmly while assistant pushes inner tube (33) into outer tube approximately 12 inches. Hold outer tube so that piston assembly (38) is centered in tool while assistant pulls inner tube in and out in short strokes as if using a slide hammer to pull piston assembly into cylinder (54) past tool CAS1704-2	
		d. Tool CAS1704-2	Remove	
		e. Ring assembly (22)	Lubricate, slide over outer tube (35), connect to cylinder (54) and tighten	Use clean hydraulic oil (refer to current lubrication order). Tighten after metal-to-metal contact
		f. Gland assembly (46)	Lubricate and install	Use clean hydraulic oil (refer to current lubrication order). Tighten after metal-to-metal contact

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

INSTALLATION/REPLACEMENT

WARNING

Be sure lift cylinder assembly is securely fastened to chain hoist. Failure to do so could cause lift cylinder assembly to fall, striking personnel and causing serious injury or death.

CAUTION

Remove bleed screw (17) to prevent damaging it when performing following step.

NOTE

Lift cylinder assembly chain trunnion roller spacers are offset from center; when installing lift cylinder assembly, be sure chain trunnion roller spacers are towards front of vehicle.

STEP	LOCATION	ITEM	ACTION	REMARKS
26	Mast assembly	a. Lift cylinder assembly (11)	Position upright using chain hoist and lower into channel pocket; if necessary, remove plug from port at bottom of cylinder	
		b. Retaining ring (15)	Install with square edge facing downwards and rounded edge facing upwards towards lift cylinder assembly	
		c. Restrictor (14)	Install with arrow pointing downwards, away from lift cylinder assembly	
		d. Elbow (13)	Install	
		e. Hose fitting (12)	Remove cap, connect and tighten	

WARNING

Keep hands and fingers clear of top of lift cylinder assembly when performing following step. Failure to do so could cause your fingers or hands to be caught between inner mast and lift cylinder assembly. You could lose a hand or finger.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Guard (11D)	Position	At bottom of outer mast (serial number 9150573 and above)

3-30. HYDRAULIC LIFT SYSTEM MAINTENANCE (cont)

e. Lift Cylinder Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
26 (cont)		g. Four washers (11C), lock washers (11B), and cap screws (11A)	Install and tighten	Serial number 9150573 and above
		h. Chain hoist	Lower inner mast while guiding top of lift cylinder assembly into position at top of mast	
27	Mast assembly, top	a. Two washers (10), spacers (9), washers (8) and cap screws (7)	Install	Tighten to 180-200 pounds foot torque
		b. Safety wire (6)	Install through head of cap screws; then twist ends together	
		c. Bleed screw (17)	Install	
28	Mast assembly, inner mast	a. Two chain pulleys (4) and pulley bars (5)	Install	Para 2-56d, steps 14a thru e
		b. Two lift chains (3)	Position over pulleys (4)	
		c. Four hose assemblies (2)	Position	
		d. Two hose pulleys (1)	Install	Para 2-56d, steps 14h thru k
29	Operator's compartment		Perform paragraph 2-56f(1), step 27	

NOTE

To prevent damage to tools CAS1704-1 and CAS1704-2, store in shipping container immediately after each use.

3-31. MAST ASSEMBLY MAINTENANCE

a. Carriage Assembly.

This task covers:
- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection/Repair
- e. Reassembly
- f. Installation/Replacement

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

TOOLS
Chain Hoist, 1/2 ton capacity
Bar, 2 inches diameter
Bar, 1-1/2 inches diameter
Bore Gage, zero to 4 inches
Micrometer, zero to four inches
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641
Hard Wooden Blocks (2), 4 by 4 by 12 inches

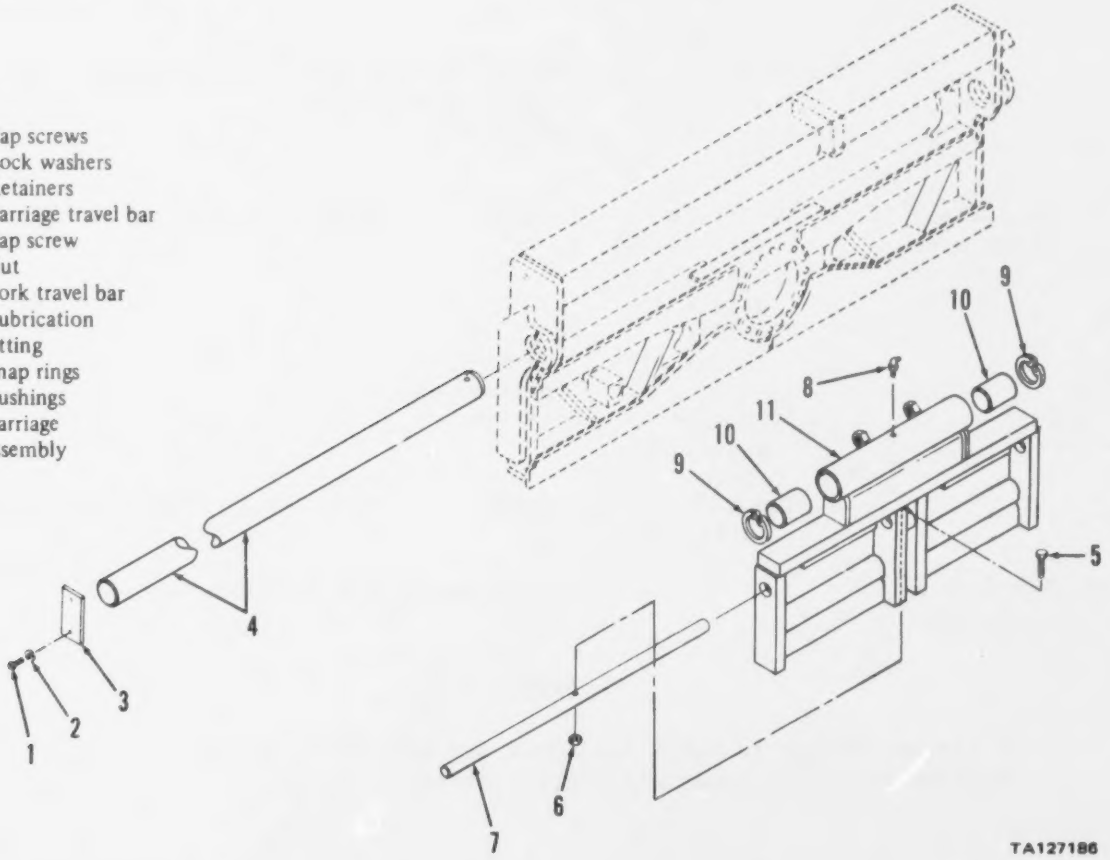
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Engine off, parking brake applied, and carriage assembly raised four inches (approximately) from ground and securely blocked.
2-56c	Forks removed.
2-56e	Side shift chains disconnected from carriage assembly.

KEY

1. Cap screws
2. Lock washers
3. Retainers
4. Carriage travel bar
5. Cap screw
6. Nut
7. Fork travel bar
8. Lubrication fitting
9. Snap rings
10. Bushings
11. Carriage assembly



3-31. MAST ASSEMBLY MAINTENANCE (cont)

a. Carriage Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Side shifter frame	a. Four cap screws (1) and lock washers (2)	Remove	
		b. Two retainers (3)	Remove	
		CAUTION Use chain hoist to support weight of carriage assembly (11) to prevent damaging carriage travel bar (4).		
		WARNING Carriage travel bar weighs 134 pounds, be careful not to injure yourself by travel bar falling on your feet or striking your legs.		
		c. Carriage travel bar (4)	Remove	Use 2 inches diameter bar and hammer to drive from side shifter
		d. Carriage assembly (11)	Remove	Use chain hoist
DISASSEMBLY				
2	Carriage assembly, center	Cap screw (5) and nut (6)	Remove	
3	Carriage assembly, sides	a. Fork travel bar (7)	Position and and remove	Use 1-1/2 inches diameter bar and hammer to drive bar from carriage
		b. Lubrication fitting (8)	Remove	
		NOTE Don't remove snap rings (9) or bushings (10) unless inspection indicates replacement is necessary.		
		c. Two snap rings (9)	Remove	
		d. Two bushings (10)	Remove	
CLEANING		**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protectivegoggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		

3-31. MAST ASSEMBLY MAINTENANCE (cont)

a. Carriage Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4		All parts	Clean	Use cleaning solvent P-D-680; dry thoroughly
INSPECTION/REPAIR				
5		Carriage travel bar (4)	Inspect	Replace if excessively worn in one area, bent, or deformed
6		Fork travel bar (7)	Inspect	Replace if excessively worn in one area, bent, deformed, or cracked
7	Carriage assembly	a. Overall	Inspect	Replace or repair by welding if cracked, broken, or structurally damaged
		b. Bushings (10)	Inspect	Replace if worn; use bore gage and measure inside diameter. Replace if measurement is more than 3 inches
8		All other parts	Inspect	Replace if damaged, cracked, or worn
REASSEMBLY				
9	Carriage assembly, sides	a. Two bushings (10)	Install	Until seated
		b. Two snap rings (9)	Install	In ring groove
		c. Fork travel bar (7)	Position and install	In bore. Use 1-1/2 inches diameter bar and drive into carriage
		d. Lubrication fitting (8)	Install	
10	Carriage assembly, center	Cap screw (5) and nut (6)	Install	If holes are not aligned, tap bar (7) until holes line up
INSTALLATION/REPLACEMENT				
11	Side shifter frame	a. Carriage assembly (11)	Position	Use chain hoist to move into position and align with side shifter frame
		b. Carriage travel bar (4)	Position and install	In bore. Use 2 inches diameter bar and drive into side shifter frame and then into carriage assembly (11) bore. Be sure bores align
		c. Two retainers (3)	Position	
		d. Four cap screws (1) and lock washers (2)	Install	

NOTE

Remove wood blocks and lower forks to ground.

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing.

This task covers:
- a. Removal
- b. Cleaning
- c. Inspection/Repair
- d. Installation/Replacement

PERSONNEL REQUIRED

Two maintenance technicians

INITIAL SETUP

TOOLS

Chain Hoist, 1/2 ton capacity	
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Tap, 5/8-11 UNC 2B	
Steel Horses (2)	

MATERIALS/PARTS

Cleaning solvent P-D-680

Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Fork assembly grounded; mast assembly in vertical position.
2-56f(1)	Hoses, lines, and fittings between control valve and mast assembly, disconnected at mast assembly and lift cylinder assembly.
2-47	Front axle tires and wheels removed.
3-31a	Carriage assembly removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Inner mast	Chain hoist	Attach	To top of inner mast; take up all slack

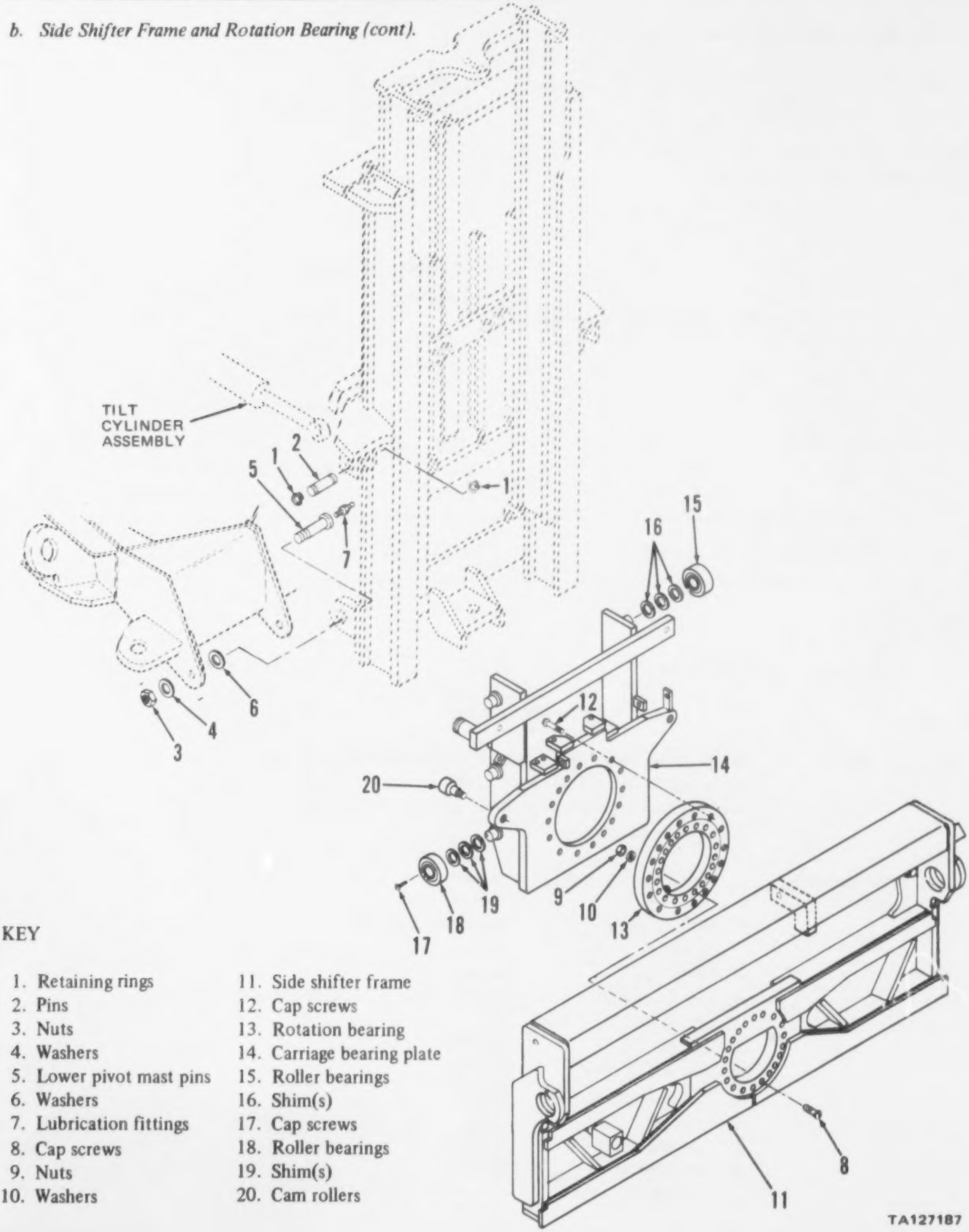
WARNING

Before performing following steps, be sure mast assembly is securely supported by chain hoist. Failure to do so will cause mast assembly to pivot forward on pivot mast pin which could result in bodily injury.

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Mast assembly, sides	a. Four retaining rings (1)	Remove	
		b. Two pins (2)	Remove	
		c. Tilt cylinder assemblies	Reposition out of way	
		d. Two nuts (3)	Loosen	
		e. Two lower pivot mast pins (5)	Tap to loosen	Use ten pound hammer
		f. Two nuts (3)	Remove	
		g. Two washers (4)	Remove	
		h. Two lower pivot mast pins (5)	Remove	
		i. Two washers (6)	Remove	
		j. Two lubrication fittings (7)	Remove	

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).


TILT CYLINDER ASSEMBLY
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KEY

1. Retaining rings
2. Pins
3. Nuts
4. Washers
5. Lower pivot mast pins
6. Washers
7. Lubrication fittings
8. Cap screws
9. Nuts
10. Washers
11. Side shifter frame
12. Cap screws
13. Rotation bearing
14. Carriage bearing plate
15. Roller bearings
16. Shim(s)
17. Cap screws
18. Roller bearings
19. Shim(s)
20. Cam rollers

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3	Mast assembly	a. Mast assembly	Remove	Use chain hoist and move to work area. Position mast on two steel horses with side shifter frame facing up
		b. Rotation cylinder assembly	Remove	Para 3-30d
		c. Sideshift cylinder assembly	Remove	Para 3-30c
4	Side shifter frame (11), front	Two sideshift chains and pulleys	Remove	Para 2-56e
5	Side shifter frame (11), center	a. 20 cap screws (8), nuts (9) and washers (10)	Remove	
		b. Chain hoist	Secure	To side shifter frame

WARNING

Be sure chain hoist is securely attached to side shifter frame (11) before performing following step. Failure to do so could cause frame (11) to fall causing serious bodily injury.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Side shifter frame (11)	Remove	
6	Carriage bearing plate (14)	a. 16 cap screws (12)	Remove	

NOTE

If cap screws (12) are difficult to remove in above step, heat cap screws then remove and discard.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Rotation bearing (13)	Remove	
		c. Four hose assemblies	Remove	Para 2-56f(2)
		d. Four tube assemblies	Remove	Para 2-56f(2)
		e. Two lift chains	Disconnect ends connected to carriage bearing plate	Para 2-56d
		f. Carriage bearing plate (14)	Move half-way out of inner mast	
		g. Sling hoist	Secure to carriage bearing plate (14)	

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
6 (cont)		**WARNING** Be sure sling hoist is securely fastened to carriage bearing plate before performing following step. Failure to do so could cause serious bodily injury.		
		CAUTION Roller bearings (15) and shims (16) may fall off carriage bearing plate in following step.		
		h. Carriage bearing plate (14)	Remove	Use sling hoist
		i, Two roller bearings (15)	Remove	
		j. Shims (16)	Remove	
		k. Two cap screws (17)	Remove	
		l. Two roller bearings (18)	Remove	
		m. Shims (19)	Remove	
		n. Two cam rollers (20)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
7		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
7 (cont)		**NOTE** Don't immerse roller bearings (15 and 18) or rotation bearing (13) in cleaning solvent.		
INSPECTION/REPAIR				
8		Lower pivot mast pin (5)	Inspect	Replace if bent or distorted, threads damaged, or worn
9		Roller bearings (15 and 18) and cam roller (20)	Inspect	Replace if out of round, scored, burred, sharp edged, or worn
10		Side shifter frame (11) and carriage bearing plate (14)	Inspect	Replace or repair by welding if cracked, broken, or structurally damaged. Replace if bent or warped
11		Rotation bearing (13)	Inspect	Replace if out of round, scored, burred, worn, or distorted. Repair damaged threads by chasing with 5/8-11 UNC 2B tap
12		All other parts	Inspect	Replace if damaged, worn, cracked, or distorted
INSTALLATION/REPLACEMENT				
13	Carriage bearing plate (14)	a. Two cam rollers (20)	Install	
		b. Shims (19)	Install	
		c. Four roller bearings (18)	Install	
		d. Two cap screws (17)	Install	On two bottom roller bearings
		e. Shims (16)	Install	
		f. Two roller bearings (15)	Install	
		g. Sling hoist	Secure to carriage bearing plate (14)	

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
13 (cont)		**WARNING** Be sure sling hoist is securely fastened to carriage bearing plate before performing following step. Failure to do so could cause serious bodily injury.		
		CAUTION Roller bearings (15) and shims (16) may fall off carriage bearing plate (14) when performing following step.		
		h. Carriage bearing plate (14)	Install	Use sling hoist. Depress locking pin and position half way into inner mast then remove sling hoist
		i. Carriage bearing plate (14)	Move into full position	
		j. Two lift chains	Connect ends to carriage bearing plate (14)	Para 2-56d
		k. Four tube assemblies	Install	Para 2-56f(2)
		l. Four hose assemblies	Install	Para 2-56f(2)
		m. Rotation bearing (13)	Position	On carriage bearing plate (14)
		n. 16 cap screws (12)	Install	
14	Side shifter frame (11)	a. Chain hoist	Secure to side shifter frame	
		WARNING Be sure chain hoist is securely attached to side shifter frame before performing following step. Failure to do so could cause serious bodily injury.		
		b. Side shifter frame (11)	Position; align holes in side shifter frame with holes in rotation bearing (13)	On rotation bearing (13)

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
14 (cont)		c. 20 cap screws (8), washers (10) and nuts (9)	Install	
		d. Chain hoist	Remove	From side shifter frame
		e. Sideshift cylinder assembly	Install	Para 3-30c
		f. Two sideshift chains and pulleys	Install	Para 2-56e
15	Mast assembly	a. Rotation cylinder assembly	Install	Para 3-30d
		b. Carriage assembly	Install	Para 3-31a, step 11
		c. Chain hoist	Attach	To top of inner mast

WARNING

Be sure chain hoist is securely fastened to top of inner mast before performing the following step. Failure to do so may cause serious bodily injury.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Mast assembly	Position; align mounting holes	In front of vehicle
16	Mast assembly, sides	a. Two washers (6)	Install	

NOTE

Use chassis grease to hold washers (6) in position if necessary.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Two lower pivot mast pins (5)	Install	
		c. Two washers (4)	Install	
		d. Two nuts (3)	Install	
		e. Two lubrication fittings (7)	Install	
		f. Tilt cylinder assemblies	Position eye on rod end between brackets on outer mast sides	

3-31. MAST ASSEMBLY MAINTENANCE (cont)

b. Side Shifter Frame and Rotation Bearing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
16 (cont)		g. Two pins (2)	Install	Secures tilt cylinder assemblies rod to outer mast
		h. Four retaining rings (1)	Install	
		i. Lift chains	Adjust	Para 2-56d
		j. Hoses, lines and fittings	Connect	Para 2-56f(1)
		k. Front axle tires and wheels	Install	Para 2-47
		l. Lubrication fittings (7) and rotation bearing (13)	Lubricate	Refer to current lubrication order
		m. Forks	Install	Para 2-56c

3-31. MAST ASSEMBLY MAINTENANCE (cont)

c. Inner and Outer Mast.

This task covers:		
	a. Removal	c. Inspection/Repair
	b. Cleaning	d. Installation/Replacement

PERSONNEL REQUIRED
Two maintenance technicians

INITIAL SETUP

TOOLS
Chain Hoist, 1/2 ton capacity
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
3-31b	Side shifter frame and rotation bearing removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Mast	a. Lift cylinder assembly	Remove	Para 3-30e
		b. Hose and tube assemblies	Remove	Para 2-56f(2)
		c. Two lift chains and pulleys	Remove	Para 2-56d
		d. Two stop bolts (1) and lock washers (2)	Remove	
2	Inner mast (3)	a. Inner mast (3)	Slide out of outer mast until bottom roller bearings (4) are in line with cut-outs in side of outer mast (12)	
		b. Chain hoist	Attach and take up slack	To inner mast at approximate center

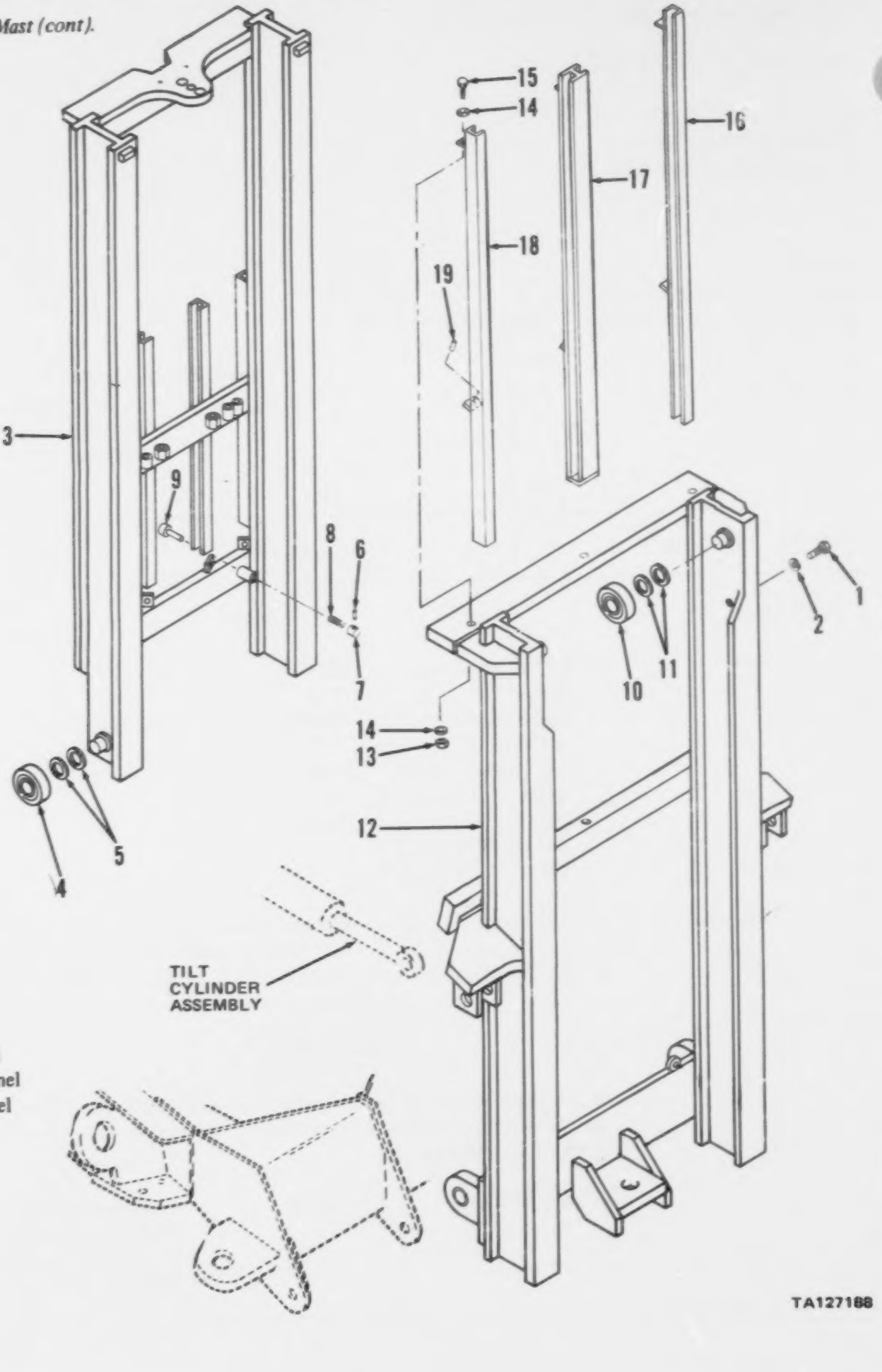
WARNING

Be sure chain hoist is securely fastened to inner mast before performing following step. Failure to do so could cause serious bodily injury by mast falling on you.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Inner mast (3)	Remove	Push down at top of inner mast to disengage roller bearings (4) from outer mast (12) while lifting inner mast using chain hoist

3-31. MAST ASSEMBLY MAINTENANCE (cont)

c. Inner and Outer Mast (cont).


15
14
16
17
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8
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1
2
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11
14
13
12
4
5
TILT CYLINDER ASSEMBLY
TA127188

KEY

1. Stop bolts
2. Lock washers
3. Inner mast
4. Roller bearings
5. Shims
6. Roll pin
7. Spring retainer
8. Spring
9. Lock pin
10. Roller bearings
11. Shims
12. Outer mast
13. Nuts
14. Washers
15. Cap screws
16. Left hose channel
17. Center hose channel
18. Right hose channel
19. Roll pins

3-31. MAST ASSEMBLY MAINTENANCE (cont)

c. Inner and Outer Mast (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2 (cont)		d. Two roller bearings (4) and shims (5)	Remove	
		e. Roll pin (6)	Remove	
		f. Spring retainer (7)	Remove	
		g. Spring (8)	Remove	
		h. Lock pin (9)	Remove	
3	Outer mast (12)	a. Two roller bearings (10)	Remove	
		b. Shims (11)	Remove	
		c. Three nuts (13) six washers (14) and three cap screws (15)	Remove	
		d. Left hose channel (16)	Remove	
		e. Center hose channel (17)	Remove	
		f. Right hose channel (18)	Remove	
		g. Three roll pins (19)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly

NOTE

Don't immerse roller bearings (4 and 10) in cleaning solvent.

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3-31. MAST ASSEMBLY MAINTENANCE (cont)

c. Inner and Outer Mast (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION/REPAIR				
5		Inner mast (3) outer mast (12), and hose channels (16, 17, and 18)	Inspect	Replace or repair by welding if cracked, broken, or structurally damaged. Replace if twisted or bent out of shape and if roller bearing posts are out of round or worn
6		Roller bearings (4 and 10)	Inspect	Replace if out of round (inside and outside diameters), worn, or damaged
7		Roll pins (6 and 19)	Inspect	Replace if bent
8		Spring retainer (7) and lock pin (9)	Inspect	Replace if damaged, bent or worn
9		Spring (8)	Inspect	Replace if damaged, distorted, or permanent set is noticed
10		All other parts	Inspect	Replace if damaged, worn, or threads damaged
INSTALLATION/REPLACEMENT				
11	Outer mast (12)	a. Three roll pins (19)	Install	On roller bearing posts
		b. Three hose channels (18, 17 and 16)	Position	
		c. Three cap screws (15), six washers (14) and three nuts (13)	Install	
		d. Shims (11)	Position	
		e. Two roller bearings (10)	Position	
12	Inner mast (3)	a. Lock pin (9)	Position	
		b. Spring (8)	Position	
		c. Spring retainer (7)	Position	
		d. Roll pin (6)	Install	
		e. Shims (5)	Install	On roller bearing posts
		f. Two roller bearings (4)	Install	
		g. Chain hoist	Attach	To approximate center of inner mast

3-31. MAST ASSEMBLY MAINTENANCE (cont)

c. Inner and Outer Mast (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION/REPLACEMENT (cont)				
		WARNING Be sure chain hoist is securely fastened to inner mast before performing the following step. Failure to do so could cause serious bodily injury.		
		h. Inner mast (3)	Install	Position so that roller bearings are in line with cut-outs in side of outer mast. Lift top of inner mast to slip roller bearings into channel of outer mast while lowering inner mast. Push inner mast into outer mast half way
		i. Chain hoist	Remove	
		j. Inner mast (3)	Position completely in outer mast	
13	Outer mast, sides	Two lock washers (2) and stop bolts (1)	Install	
14	Mast	a. Lift cylinder assembly	Install	Para 3-30e
		b. Lift chains and pulleys	Install	Para 2-56d
		c. Hose and tube assemblies	Install	Para 2-56f(2)
		d. Side shifter frame and rotation bearing	Install	Para 3-31b

CHAPTER 4

GENERAL SUPPORT MAINTENANCE PROCEDURES

CHAPTER OVERVIEW

The purpose of this chapter is to provide you with all needed instructions and additional information to help you at the general support level keep the equipment in good repair.

4-1. CHAPTER INDEX

Section		Page
I.	Engine and Fuel System Maintenance Procedures	4-1
II.	Power Train Maintenance	4-132
III.	Chassis Maintenance	4-251

Section I. ENGINE AND FUEL SYSTEM MAINTENANCE PROCEDURES

This section contains maintenance procedures for the engine, fuel injectors, and fuel injection pump.

	Para
Engine Maintenance	4-2
Cylinder Block Assembly	4-2a
Cylinder Head and Valves	4-2b
Crankshaft Oil Seal Retainer Assembly	4-2c
Crankshaft and Main Bearings	4-2d
Flywheel and Flywheel Housing	4-2e
Pistons and Connecting Rods	4-2f
Camshaft and Bearings	4-2g
Timing Gear Cover	4-2h
Oil Pump	4-2i
Fuel System Maintenance	4-3
Fuel Injector	4-3a
Fuel Injection Pump	4-3b

4-2. ENGINE MAINTENANCE

a. Cylinder Block Assembly.

This task covers repair of the cylinder block assembly consisting of:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS	
Brass Wire Probe	
Wire, .020 inch diameter	
Thickness Gage	NSN 5210-00-221-1999
Steel Straight Edge	FSCM 45225 P/N CAS-1369A
Micrometer, zero to 5 inches	
Industrial Goggles	NSN 4240-00-269-7912
Bore Gage, zero to 5 inches	
Plasti gage	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Sleeve, 3-3/16 inches diameter	
Sleeve, 3/4 inch diameter	
Sleeve, 1 inch diameter	

SPECIAL TOOLS	
Clamping Bar	FSCM 10988 P/N A40682
Ball	FSCM 10988 P/N A28312
Clamping Disc	FSCM 10988 P/N A142802

MATERIALS/PARTS
Paint
Cleaning solvent P-D-680
Clean cloths
Blue Vitriol solution
O-rings
Oil, No. 30
Dry ice

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5g	Cylinder head assembly removed.
3-5k	Oil pan removed.
4-2h	Timing gear cover removed.
4-2i	Oil pump removed.
4-2e	Flywheel and flywheel housing removed.
4-2c	Crankshaft oil seal retainer removed.
4-2d	Crankshaft and main bearings removed.
4-2f	Pistons and connecting rod removed.
4-2g	Camshaft and bearings removed.

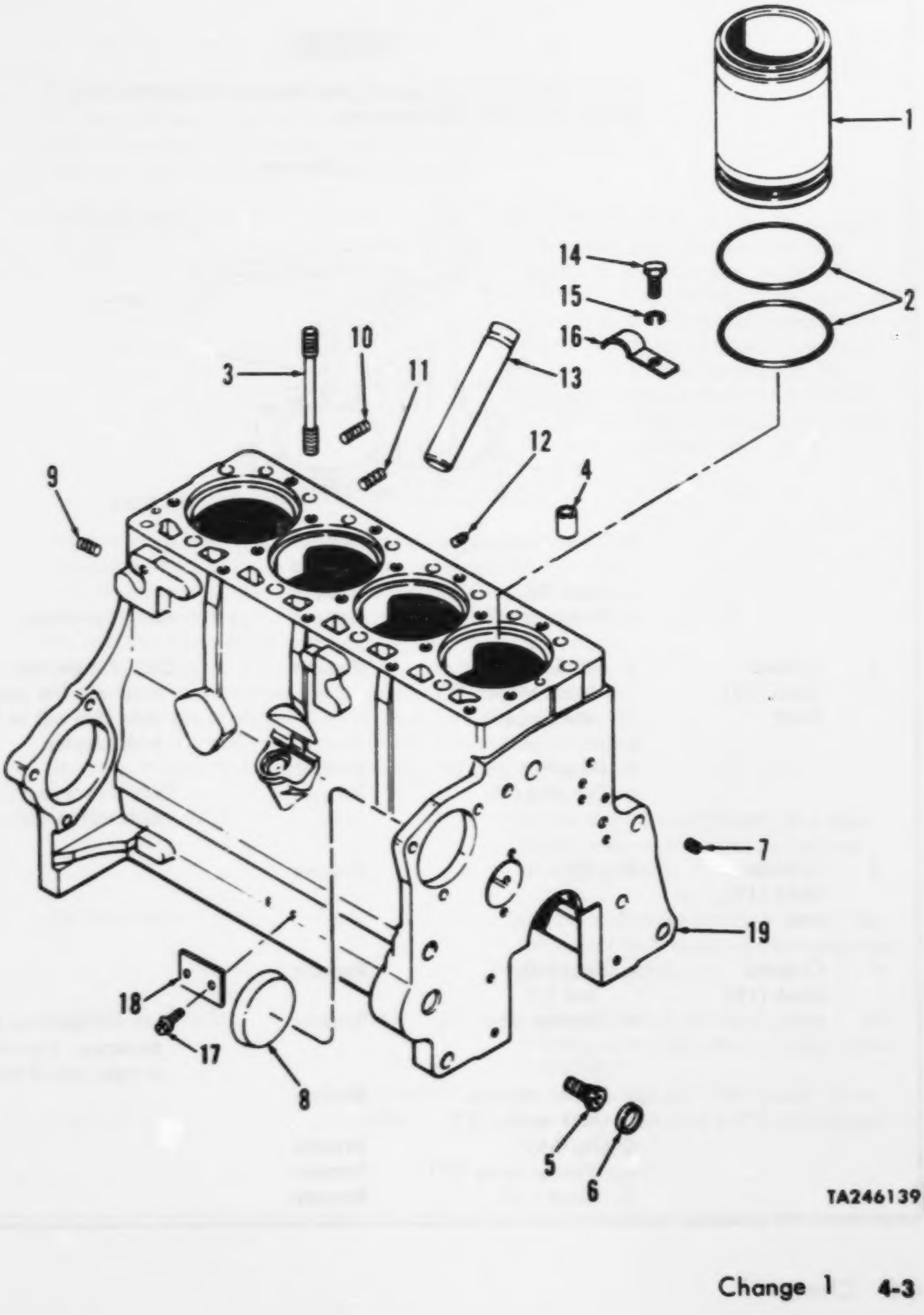
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
		NOTE Remove cylinder sleeves only if inspection indicates removal/replacement is necessary.		
1	Cylinder block (19), top	a. Cylinder sleeve (1)	a. Identify	Number and mark for position in relation to block if sleeves may be reinstalled. Use paint

4-2. ENGINE MAINTENANCE (cont)

a. Cylinder Block Assembly (cont).

KEY

1. Cylinder sleeve
2. O-rings
3. Stud
4. Dowel ring
5. Oil filter to block adapter
6. Plug
7. Oil gallery plug
8. Cup plug
9. Plug
10. Plug
11. Plug
12. Plug
13. Dipstick tube
14. Screw
15. Lock washer
16. Clip
17. Screw
18. Plate
19. Cylinder block



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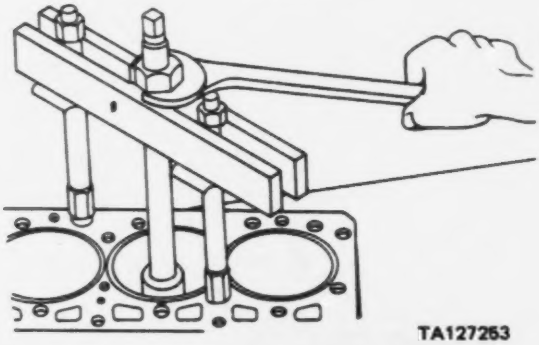
4-2. ENGINE MAINTENANCE (cont)

a. Cylinder Block Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
1 (cont)		**CAUTION** If crankshaft and main bearing were not removed, cover them before performing following step.		
			b. Remove	
		 TA127253		
		b. Two O-rings (2)	Remove and discard	
		c. Stud (3)	Remove	
		d. Dowel ring (4)	Remove	Only if necessary
2	Cylinder block (19), front	a. Oil filter to block adapter (5) and plug (6)	Remove	Only if inspection indicates replacement required. Use hammer and tap adapter out. Plug will be forced out of block with adapter.
		b. Oil gallery plug (7)	Remove	
		c. Cup plug (8)	Remove	Only if necessary; use sleeve (3-3/16 inches diameter) to remove
3	Cylinder block (19), rear	Plug (9)	Remove	
4	Cylinder block (19), side	a. Plugs (10, 11, and 12)	Remove	
		b. Dipstick tube (13)	Remove	Only if inspection indicates replacement necessary. Use wrench or other device to twist out of block
		c. Screw (14) and lock washer (15)	Remove	
		d. Clip (16)	Remove	
		e. Two screws (17)	Remove	
		f. Plate (18)	Remove	

4-2. ENGINE MAINTENANCE (cont)

a. Cylinder Block Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
5		Cylinder block (19)	Clean	Clean cylinder and crankcase oil passages thoroughly using moisture-free compressed air and brass wire probe. Clean exterior with live steam. Clean upper and lower cylinder grooves, oil galleries and drain openings thoroughly. Clean camshaft bushing bores thoroughly. Use 0.020 inch wire to clean camshaft bushing bore jets. Dry thoroughly with moisture free compressed air.
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
6		Cylinder sleeves (1)	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air or clean cloths
7		All other parts	Clean	Immerse in cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air or clean cloths
INSPECTION				
8		Cylinder block (19)	a. Inspect	Replace if cracked, damaged, worn, eroded, or distorted or if grooves and lands pitted or eroded
			b. Measure top surface	Use straight edge and feeler gauge. If surface varies more than 0.002 inch replace block

4-2. ENGINE MAINTENANCE (cont)

a. Cylinder Block Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
8 (cont)			c. Measure cylinder sleeve bores	Check taper and out-of-roundness with bore gauge. If taper or out-of-roundness exceeds 0.002 inch, replace block
9		Cylinder sleeve (1)	a. Inspect	Replace if smooth, shiny surface along complete length or heavy vertical lines fringed by metal transferring from one spot to another are observed

WARNING

Blue Vitriol solution contains acid. Wear safety glasses to protect eyes from accidental splashing and avoid splashing solution on skin. If solution is splashed on your skin or in your eyes, wash off immediately with water and get medical aid.

STEP	LOCATION	ITEM	ACTION	REMARKS
			b. Check chrome plating	Wet inside of sleeve with cotton swab saturated with Blue Vitriol solution. If bright copper color is observed, replace sleeve. Rinse tested surfaces with water after check

NOTE

If Blue Vitriol solution cannot be obtained from druggist, a satisfactory solution can be made from copper sulfate crystals available at hobby stores or pharmacies. To prepare solution: add one tablespoon fresh battery acid to one cup water; add 1/2 level teaspoon copper sulfate crystals to solution; stir with plastic spoon until crystals are dissolved.

STEP	LOCATION	ITEM	ACTION	REMARKS
			c. Check sleeve inside diameter for taper	Use inside micrometer or bore gage. Check below top ring location and at several points down length. Replace if taper is more than 0.002 inch
			d. Check sleeve out-of-roundness	Use bore gage. Measure lengthwise just below top ring location at four points 90 degrees from each other. Replace if out-of-roundness exceeds 0.001 inch. (Use micrometer to check bore gage.)
10		Oil filter to block adapter (5) and stud (3)	Inspect	Replace if bent or threads damaged

4-2. ENGINE MAINTENANCE (cont)

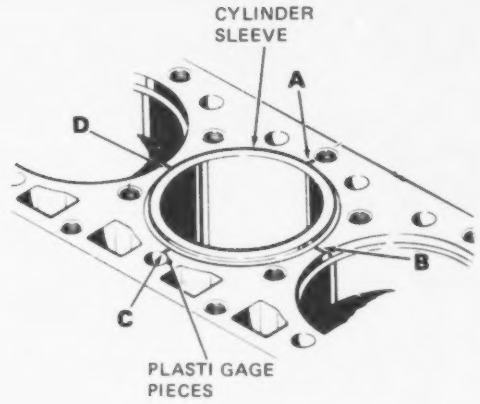
a. Cylinder Block Assembly (cont).

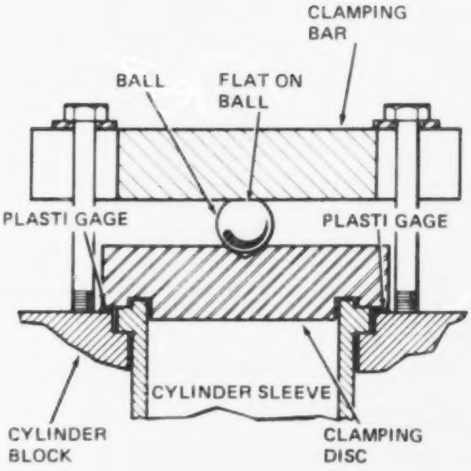
STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
11		Dipstick tube (13)	Inspect	Replace if bent, cracked, or dented
12		Dowel ring (4)	Inspect	Replace if deformed or nicked
13		All other parts	Inspect	Replace if threads are damaged
REASSEMBLY				
14	Cylinder block (19), side	a. Plate (18)	Position	
		b. Screw (17)	Install	
		c. Clip (16)	Position	
		d. Lock washer (15) and screw (14)	Install	
		e. Dipstick tube (13)	Install	If removed. Chill in dry ice and install smooth end in block until firmly seated
		f. Plugs (10, 11, and 12)	Install	
15	Cylinder block (19), rear	Plug (9)	Install	
16	Cylinder block (19), front	a. Cup plug (8)	Install	Install from rear until flush with front of block
		b. Oil gallery plug (7)	Install	
		c. Oil filter to block adapter (5)	Install	If removed. Install from front of block. Use 3/4 inch diameter sleeve and install until firmly seated
		d. Plug (6)	Install	If removed. Install with lip towards front of block; use 1 inch diameter sleeve and install until firmly seated
		e. Dowel ring (4)	Install	If removed. Cool in dry ice. Install until firmly seated
17	Cylinder sleeve (1)	O-ring (2)	a. Install b. Lubricate	In cylinder sleeve bottom grooves Use No. 30 oil
18	Cylinder block (19), top	a. Cylinder sleeve bore	Clean	Upper and lower grooves
		NOTE If old sleeves are being reinstalled, install in same location and position as they were prior to removal.		
		b. Cylinder sleeve (1)	a. Install	Don't rotate sleeve during installation and be careful not to damage O-rings. Use hand pressure to install

4-2. ENGINE MAINTENANCE (cont)

a. Cylinder Block Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
18 (cont)			b. Measure sleeve protrusion	Position plasti gage at four points shown. Plasti gage must not protrude onto sleeve flange. Install clamping disc tool carefully over sleeve as shown. Install 1 inch ball and clamping bar. Tighten hold down bolts evenly to 50 pounds foot torque. Then, remove clamping bolts, bar and ball. Carefully remove clamping disc so as not to disturb plasti gage. Flattened plasti gage will be on clamping disc or block. Measure plasti gage. If sleeve protrusion varies more than 0.005 inch around circumference, replace that sleeve and recheck


CYLINDER SLEEVE
A
D
B
C
PLASTI GAGE PIECES


CLAMPING BAR
BALL
FLAT ON BALL
PLASTI GAGE
PLASTI GAGE
CYLINDER SLEEVE
CYLINDER BLOCK
CLAMPING DISC

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4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves.

This task covers overhaul of the cylinder head and replacement/repair of the valves consisting of:

a. Removal
b. Cleaning
c. Inspection and Repair
d. Valves and Valve Seat Refacing
e. Installation

INITIAL SETUP

TOOLS

Expandable Bore Gage, zero to 1/2 inch	
Fine Rotary Wire Brush	
Micrometer, zero to 5 inches	
Feeler Gage	NSN 5210-00-221-1999
Precision Seat Grinder	
Valve Refacing Machine	
45 degree Grinding Stone	
60 degree Grinding Stone	
30 degree Grinding Stone	
Valve Spring Compressor Tool	
Steel Straight Edge	
Power Driven Fine Wire Brush	
Valve Seat Removal Tool	
Vee Block Holder	
Spring Tester	
No. 2 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0650

SPECIAL TOOLS

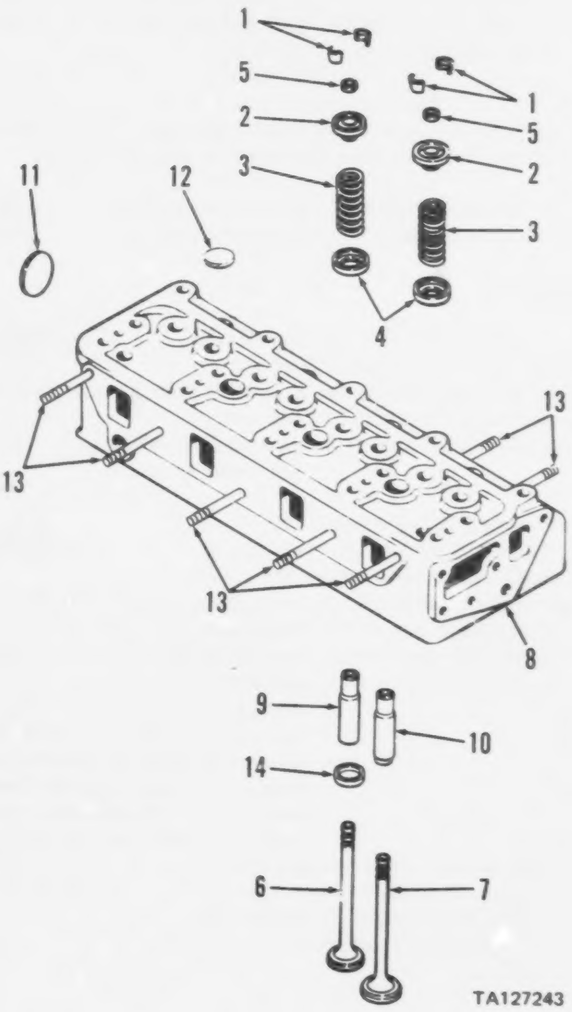
Reamer	FSCM 10988 P/N A43112

MATERIALS/PARTS

Cleaning Solvent P-D-680
Clean cloths
Dry ice
Oil, No. 30
Valve keepers
Emery cloth, medium grit

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5j	Rocker arm assembly removed.
3-5g	Cylinder head assembly removed.



KEY
1. Valve keepers
2. Spring retainer
3. Valve spring
4. Spring seat
5. Valve stem seal
6. Exhaust valve
7. Intake valve
8. Cylinder head
9. Exhaust valve guide
10. Intake valve guide
11. Plug
12. Plug
13. Studs
14. Exhaust valve seat insert

4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Cylinder head (8), top	a. Valve spring (3)	Compress	Use valve spring compressor tool
		b. Two valve keepers (1)	Remove and discard	
		c. Valve spring (3)	Release	Carefully release pressure on valve spring compressor tool
		d. Spring retainer (2)	Remove	
		e. Valve spring (3)	Remove	
		f. Spring seat (4)	Remove	
		g. Valve stem seal (5)	Remove	

NOTE

Identify (number) valves (6 and 7) and respective bores for reference during installation.

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Cylinder head (8), bottom	a. Exhaust valve (6)	Remove	
		b. Intake valve (7)	Remove	
CLEANING				

CAUTION

In following step be careful not to scratch valve stems.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Four exhaust valves (6) and intake valves (7)	Clean	Use fine power driven wire brush

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

4	Cylinder head (8)	a. Overall	Clean	Use cleaning solvent P-D-680. Dry with moisture free compressed air or clean cloth
		b. Valve ports	Clean	Use fine rotary wire brush
		c. Machined surface areas	Clean	Use medium grit emery cloth carefully to remove all gasket material, carbon and rust
5		All other parts	Clean	Use cleaning solvent P-D-680. Dry with moisture free compressed air
INSPECTION AND REPAIR				
6		Valve spring (3)	Inspect	Install in spring tester. Check that force to compress spring to 1.521 inch is 110 to 118 pounds; force to compress spring to 1.875 inch is 53 to 59 pounds. Replace spring if force is less than these values
7	Cylinder head (8)	a. Bottom surface	Check warpage	Lay straight edge diagonally from corner to corner and try to get a 0.006 inch feeler gage under straight edge. Check at several points. Reposition straight edge at opposite corners and repeat checks. If warpage is greater than 0.006 inch resurface or replace cylinder head

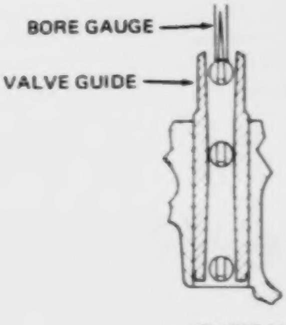
NOTE

If cylinder head is resurfaced, maintain a minimum thickness of 3.968 inches.

		b. Valve guides (9 and 10)	Check inside diameter	Use bore gage and check in three places as shown below. Measure bore gage with micrometer. If greater than 0.3449 inch at any point replace valve guides

4-2. ENGINE MAINTENANCE (cont)

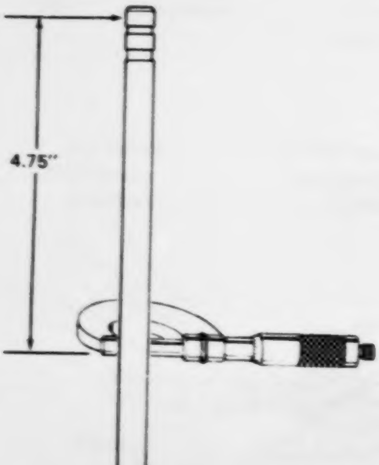
b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
7 (cont)		 TA127244		
		NOTE If valve guides (9 and 10) require replacement, perform c below; otherwise proceed to d.		
		c. Valve guides (9 and 10)	a. Remove	Use hydraulic press and press guides from top, through cylinder head
			b. Position and install	On top of cylinder head. Use hydraulic press and push into head until valve guide protrudes 0.875 inch above top of head
			c. Ream	Use A43112 reamer. Ream to 0.3429-0.3439 inch
		d. Plugs (11 and 12)	Inspect	Check for damage and looseness. If plugs are damaged or loose, replace
		NOTE If plugs (11 and 12) require replacement, perform e, f, and g below; otherwise proceed to h.		
		e. Plugs (11 and 12)	Remove	Drill and pry out
		f. Plug (11)	Install	Until seated, then strike with hammer to expand
		g. Plug (12)	Install	To 0.370 inch depth

4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
7 (cont)		h. Studs (13)	Inspect	Inspect for bent condition and damaged threads. If bent or threads damaged, replace. Replace by unscrewing stud and screwing new stud into cylinder head
8	Exhaust valve (6) and intake valve (7)	a. Overall	Inspect	Replace if valve stem is nicked, valve face grooved, heavy carbon and/or varnish deposits, rust or pitting on valve stem or valve face, burned valve face, or dished valve head. Fine pitting on surface of valve face or seat is normal
		b. Retainer groove	Inspect	Replace if worn or if stem tip is worn
		c. Stem diameter	Measure stem diameter	Three places as shown. Replace exhaust valve (6) if less than 0.3389 inch. Replace intake valve (7) if less than 0.3399 inch



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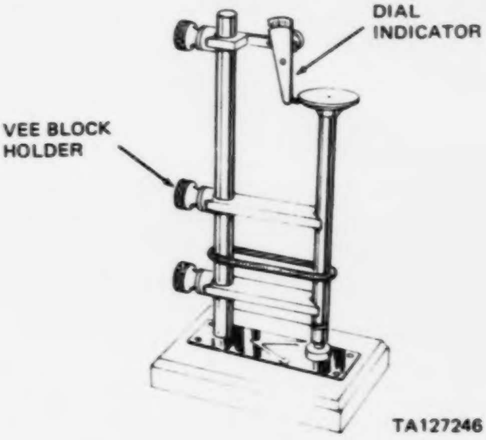
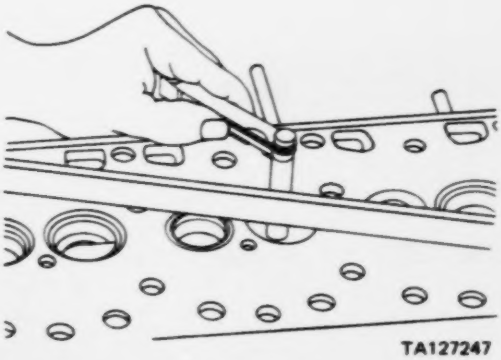
4-2. ENGINE MAINTENANCE (cont)

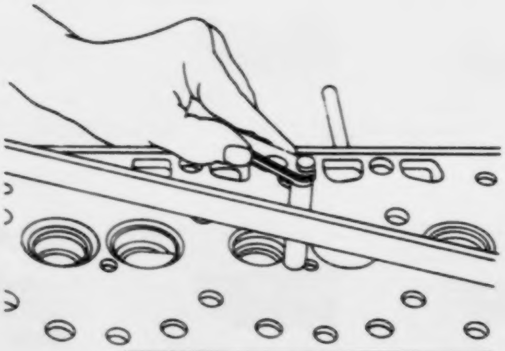
b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
8 (cont)		d. Valve face and stem runout	Measure	Check as shown below. If runout exceeds 0.002 inch, replace valve
				
9	Cylinder head (8)	a. Intake valve (7) and exhaust valve (6)	Install and check valve recession	Check as shown below. If exhaust valve recession is more than 0.005 inch, replace valve or valve seat insert. If intake valve recession is more than 0.005 inch, replace intake valve and recheck recession. If recession is still more than 0.005 inch, replace or resurface cylinder head (minimum cylinder head thickness of 3.968 inches must be maintained)
				

4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

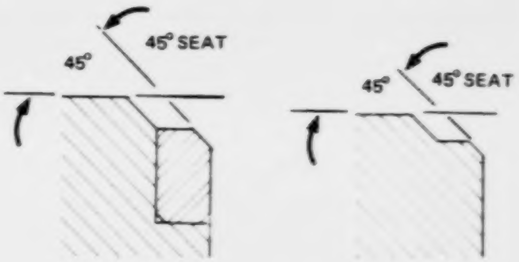
STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
9 (cont)		**NOTE** If valve seat inserts (14) require replacement perform steps b and c below; otherwise proceed to step d below.		
		CAUTION Don't remove valve seat inserts (14) with punch, chisel or pry bar as damage to cylinder head will result.		
		b. Valve seat insert (14)	Remove	Use seat removal tool or machine inserts out of cylinder head
		c. Valve seat insert (14)	Cool and install	Clean valve seat insert recesses in cylinder head. Place new inserts in dry ice to shrink them, then install by pressing into cylinder block until bottomed in recess
		d. Intake valve (7) and exhaust valve (6)	Install and check valve protrusion	Check as shown below. If protrusion is more than 0.005 inch, valve and seat must be ground. Refer to intake and exhaust valves and valve seat refacing following



TA127248

4-2. ENGINE MAINTENANCE (cont)

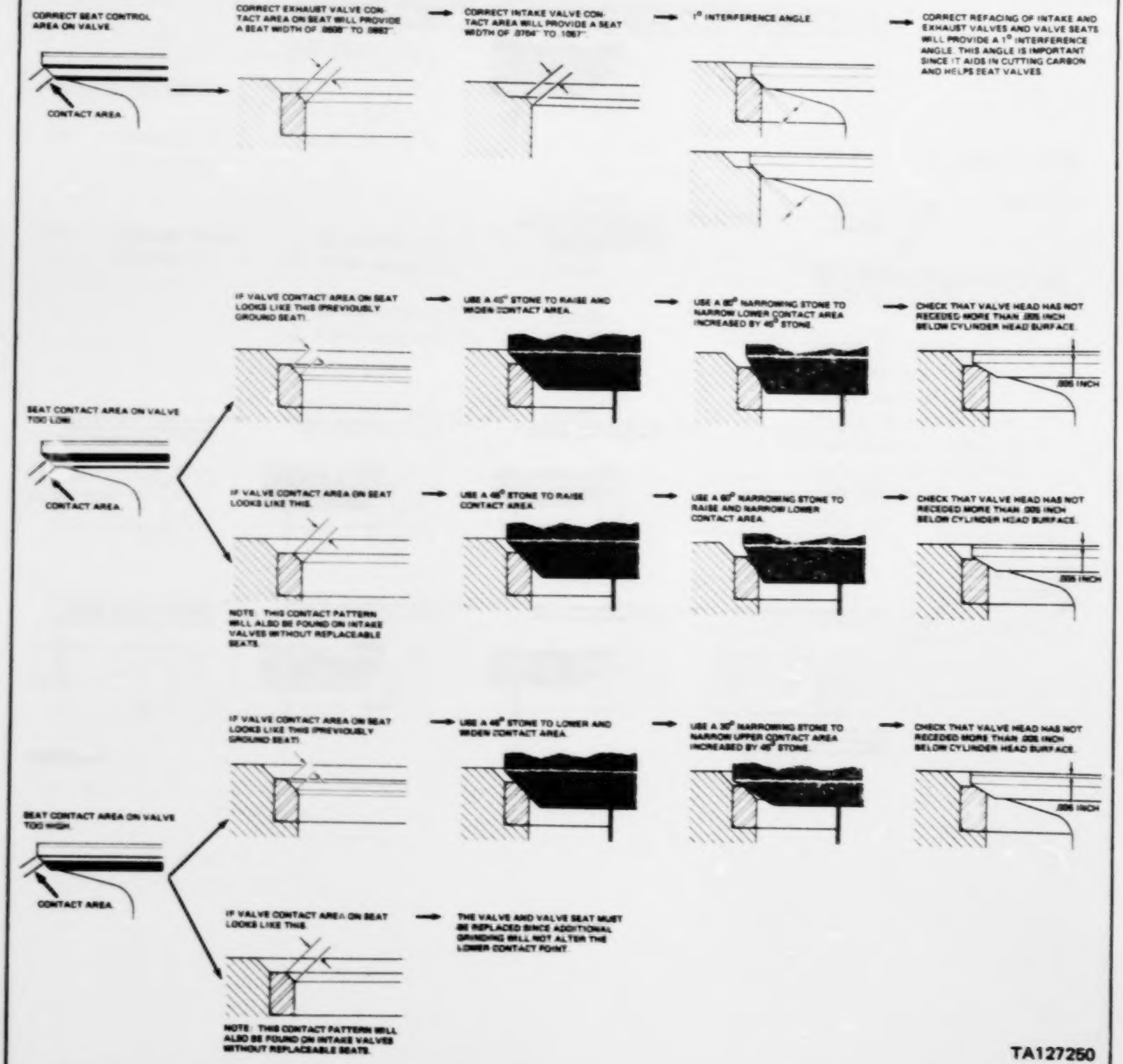
b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
VALVES AND VALVE SEAT REFACING				
10	Refacing machine	a. Protractor b. Chuck c. Grinding wheel	Set Clean Dress	At 44 degree angle
11		Valves (6 and 7)	Grind lightly	Grinding angle is 44 degrees
		NOTE Replace any valve that has a thin margin or edge. If margin on ground valve is less than half margin on new valve, replace that valve.		
12		Valve seats and inserts (14)	Grind lightly	Grinding angle as shown. Use precision seat grinder. Take very light cuts to remove just enough metal to obtain a smooth seat finish.
		 EXHAUST VALVE INTAKE VALVE TA127249		
13		Valves (6 and 7)	a. Apply valve bluing b. Install c. Remove	Use Prussian Blue. Apply to valve face In cylinder head (8). Rotate valve in seat Check contact area on valve face and seat. Bluing will be removed from valve face where contact was made with seat. Correct and incorrect indications along with remedial procedures are shown below

4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
VALVES AND VALVE SEAT REFACING (cont)				
13 (cont)				


CORRECT SEAT CONTROL AREA ON VALVE.
CONTACT AREA
CORRECT EXHAUST VALVE CONTACT AREA ON SEAT WILL PROVIDE A SEAT WIDTH OF [illegible]" TO [illegible]".
CORRECT INTAKE VALVE CONTACT AREA WILL PROVIDE A SEAT WIDTH OF .0784" TO .1057".
1° INTERFERENCE ANGLE.
CORRECT REFACING OF INTAKE AND EXHAUST VALVES AND VALVE SEATS WILL PROVIDE A 1° INTERFERENCE ANGLE. THIS ANGLE IS IMPORTANT SINCE IT AIDS IN CUTTING CARBON AND HELPS SEAT VALVES.
SEAT CONTACT AREA ON VALVE TOO LOW.
CONTACT AREA.
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS (PREVIOUSLY GROUND SEAT).
USE A 45° STONE TO RAISE AND WIDEN CONTACT AREA.
USE A 60° NARROWING STONE TO NARROW LOWER CONTACT AREA INCREASED BY 45° STONE.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS.
USE A 45° STONE TO RAISE CONTACT AREA.
USE A 60° NARROWING STONE TO RAISE AND NARROW LOWER CONTACT AREA.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
NOTE: THIS CONTACT PATTERN WILL ALSO BE FOUND ON INTAKE VALVES WITHOUT REPLACEABLE SEATS.
SEAT CONTACT AREA ON VALVE TOO HIGH.
CONTACT AREA.
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS (PREVIOUSLY GROUND SEAT).
USE A 45° STONE TO LOWER AND WIDEN CONTACT AREA.
USE A 30° NARROWING STONE TO NARROW UPPER CONTACT AREA INCREASED BY 45° STONE.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS.
THE VALVE AND VALVE SEAT MUST BE REPLACED SINCE ADDITIONAL GRINDING WILL NOT ALTER THE LOWER CONTACT POINT.
NOTE: THIS CONTACT PATTERN WILL ALSO BE FOUND ON INTAKE VALVES WITHOUT REPLACEABLE SEATS.

TA127250

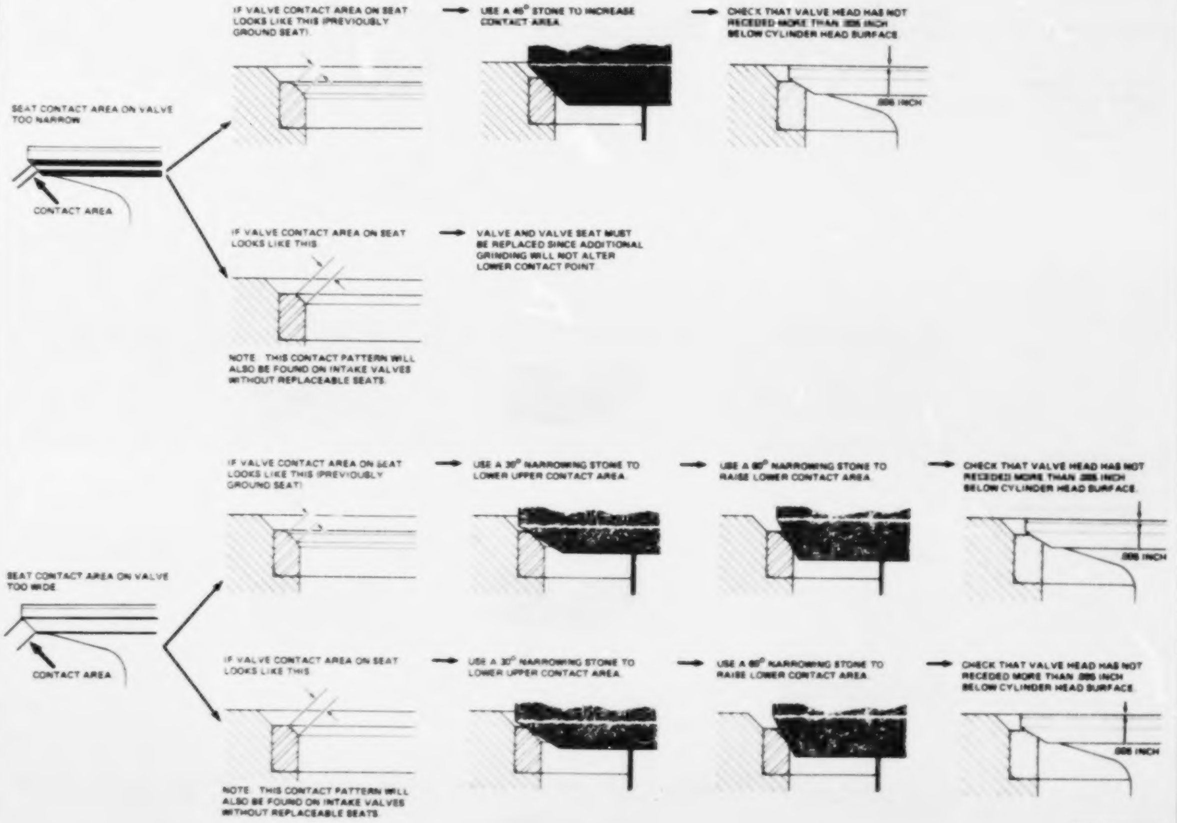
4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

VALVES AND VALVE SEAT REFACING (cont)

13
(cont)


IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS (PREVIOUSLY GROUND SEAT).
USE A 45° STONE TO INCREASE CONTACT AREA.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
SEAT CONTACT AREA ON VALVE TOO NARROW
CONTACT AREA
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS
VALVE AND VALVE SEAT MUST BE REPLACED SINCE ADDITIONAL GRINDING WILL NOT ALTER LOWER CONTACT POINT.
NOTE: THIS CONTACT PATTERN WILL ALSO BE FOUND ON INTAKE VALVES WITHOUT REPLACEABLE SEATS.
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS (PREVIOUSLY GROUND SEAT)
USE A 30° NARROWING STONE TO LOWER UPPER CONTACT AREA.
USE A 60° NARROWING STONE TO RAISE LOWER CONTACT AREA.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
SEAT CONTACT AREA ON VALVE TOO WIDE
CONTACT AREA
IF VALVE CONTACT AREA ON SEAT LOOKS LIKE THIS
USE A 30° NARROWING STONE TO LOWER UPPER CONTACT AREA.
USE A 60° NARROWING STONE TO RAISE LOWER CONTACT AREA.
CHECK THAT VALVE HEAD HAS NOT RECEDED MORE THAN .005 INCH BELOW CYLINDER HEAD SURFACE.
.005 INCH
NOTE: THIS CONTACT PATTERN WILL ALSO BE FOUND ON INTAKE VALVES WITHOUT REPLACEABLE SEATS.

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4-2. ENGINE MAINTENANCE (cont)

b. Cylinder Head and Valves (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
VALVES AND VALVE SEAT REFACING (cont)				
13 (cont)		**NOTE** After valves and valve seat are ground, valve recession and protrusion must be rechecked (step 9a and d, respectively, of inspection and repair).		
INSTALLATION				
14	Cylinder head, (8) bottom	Valves (6 and 7)	a. Lubricate valve stems	Use No. 30 oil
			b. Install	In proper bore
15	Cylinder head, (8) top	a. Spring seat (4)	Install	
		b. Valve spring (3)	Install	With closed damping coil end towards cylinder head
		c. Spring retainer (2)	Install	
		d. Valve stem seal (5)	Install	Use valve spring compressor tool and compress spring. Install in lower stem groove
		e. Two valve keepers (1)	Install	On top valve stem groove. Remove valve spring compressor tool carefully and tap valve stem to seat valve keepers

4-2. ENGINE MAINTENANCE (cont)

c. *Crankshaft Oil Seal Retainer Assembly.*

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Sleeve, 2-7/8 inches diameter	
Arbor press	

SPECIAL TOOLS

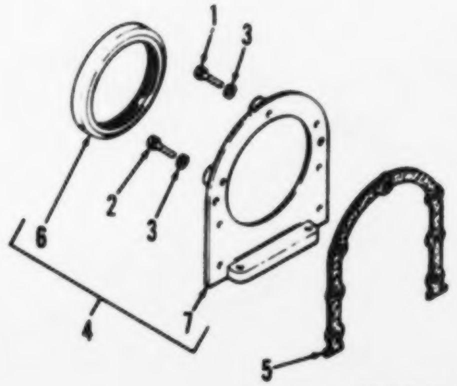
Sleeve Tool	FSCM 10988 P/N G15028
Aligning Tool	FSCM 10988 P/N G13506

MATERIALS/PARTS

Cleaning solvent P-D-680		Oil, No. 30
Clean cloths		Oil seal
Permatex 2	NSN 8030-00-873-4792	Gasket

EQUIPMENT CONDITION

Paragraph	Condition Description
4-2e	Flywheel and flywheel housing removed.



KEY

1. Cap screws
2. Cap screws
3. Lock washers
4. Crankshaft oil seal retainer assembly
5. Gasket
6. Oil seal
7. Rear oil seal retainer

4-2. ENGINE MAINTENANCE (cont)

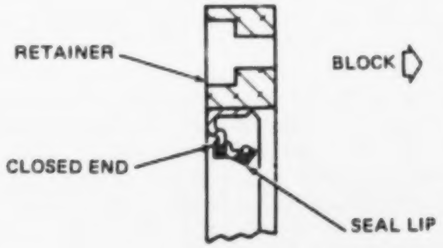
c. Crankshaft Oil Seal Retainer Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
		NOTE Note cap screws (1 and 2) positioning for installation.		
1	Cylinder block, rear	a. Seven cap screws (1 and 2) and lock washers (3)	Remove	
		b. Crankshaft oil seal retainer assembly (4)	Remove	
		c. Gasket (5)	Remove and discard	
2	Crankshaft oil seal retainer assembly (4)	Oil seal (6)	Remove and discard	Use 2-7/8 inches diameter sleeve
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
3		All parts	Clean	Use cleaning solvent P-D-680. Dry with moisture free compressed air or clean cloth

4-2. ENGINE MAINTENANCE (cont)

c. Crankshaft Oil Seal Retainer Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
4	Cylinder block, rear	Gasket (5) area	Clean	Remove traces of gasket using cleaning solvent P-D-680. Dry with moisture free compressed air
INSPECTION				
5		All parts	Inspect	Check for cracks, damage and distortion. Replace part if any of these conditions observed
6	Cylinder block, rear	Gasket (5) area	Inspect	Check that all traces of gasket (5) removed
INSTALLATION				
7	Crankshaft oil seal retainer assembly	a. Rear oil seal retainer (7)	Position	On press
		b. Oil seal (6)	Install	Press into retainer until seal is flush with rear of retainer
8	Cylinder block, rear	a. Gasket (5) area	Coat	Apply Permatex 2 from lower screw holes to bottom of block



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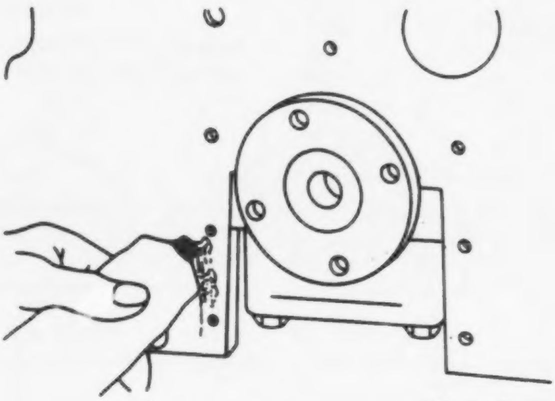
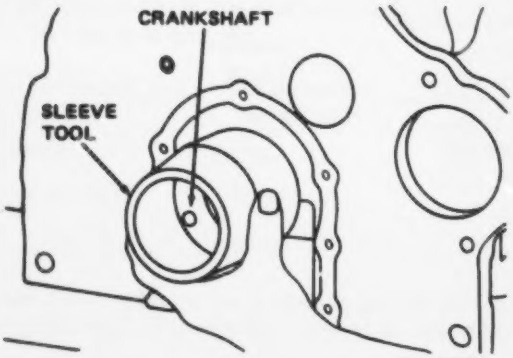
4-2. ENGINE MAINTENANCE (cont)

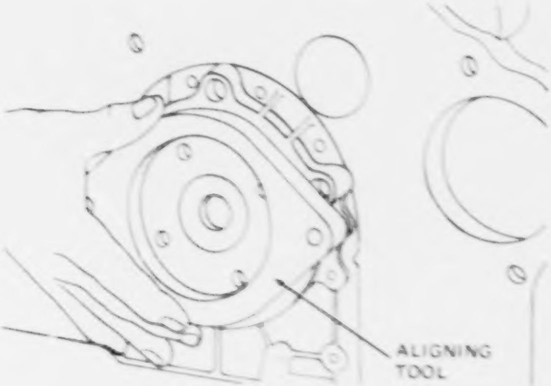
c. Crankshaft Oil Seal Retainer Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
8 (cont)		 TA127193		
		b. Gasket (5)	Install and coat	Apply Permatex 2 from lower screw holes to bottom of gasket.
		c. Sleeve tool	Install	
		 TA127194		
		d. Oil seal (6)	Lubricate	Use No. 30 oil
		e. Crankshaft oil seal retainer assembly (4)	Position	Slide oil seal on sleeve until retainer assembly is against gasket (5), then trim excess gasket material.
		f. Sleeve tool	Remove	

4-2. ENGINE MAINTENANCE (cont)

c. Crankshaft Oil Seal Retainer Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
8 (cont)		g. Aligning tool	Install	With tool pins in aligning holes of retainer assembly (4) and over crankshaft flange



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STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Three cap screws (2) and lock washers (3)	Install	In top and two bottom holes. Tighten until retainer assembly (4) and gasket press firmly against cylinder block
		i. Aligning tool	Remove	
		j. Four cap screws (1) and lock washers (3)	Install	Tighten to 12-15 pounds foot torque
		k. Three cap screws (2)	Tighten	Tighten to 12-15 pounds foot torque

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings.

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

Gear and Bearing Heater	
Dial Indicator	
Plasti Gage	
Micrometer, zero to five inches	
Universal Gear Puller	NSN 5120-00-378-4293
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Bore Gage, zero to 5 inches	

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5k	Oil pan removed.
3-5g	Cylinder head assembly removed.
4-2h	Timing gear cover removed.
4-2i	Oil pump removed.
4-2e	Flywheel and flywheel housing removed.
4-2c	Crankshaft oil seal retainer removed.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Asbestos gloves
Oil, No. 30

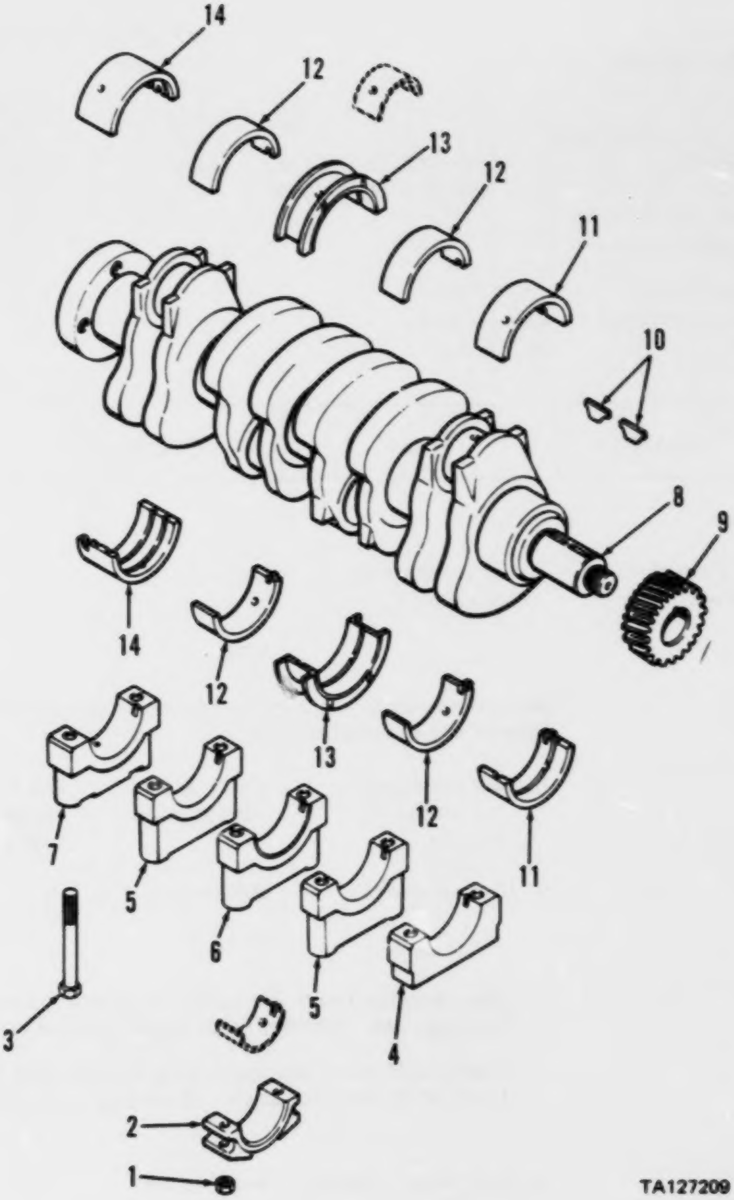
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Cylinder block	a. Eight connecting rod nuts (1)	Remove	
		NOTE Bearing liners are locked in groove of connecting rod bearing cap. Remove with cap as an assembly.		
		b. Four connecting rod bearing caps (2)	Check, remove, and set aside	Check that cap (2) and connecting rods are numbered as to location in block. Number cap and rod if necessary
		c. 10 cap screws (3)	Remove	
		NOTE Main bearing liners are locked in groove of main bearing caps. Remove with cap as an assembly. Check that main bearing caps are numbered for location in cylinder block. If necessary, number.		
		d. Front main bearing cap (4)	Remove and set aside	
		e. Two intermediate main bearing caps (5)	Remove and set aside	

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

KEY

1. Connecting rod nuts
2. Connecting rod bearing caps
3. Cap screws
4. Front main bearing cap
5. Intermediate main bearing caps
6. Center main bearing cap
7. Rear main bearing cap
8. Crankshaft
9. Crankshaft gear
10. Key
11. Front main bearing liner
12. Intermediate main bearing liners
13. Center main bearing liner
14. Rear main bearing liner



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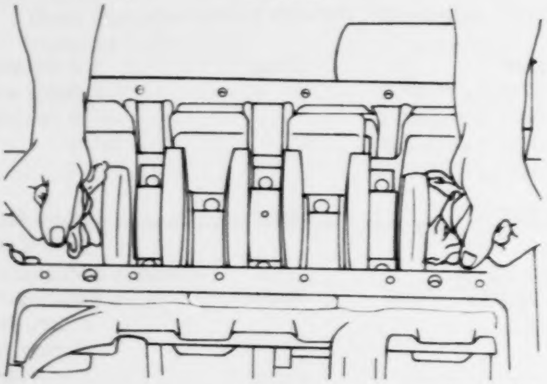
4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
1 (cont)		f. Center main bearing cap (6)	Remove and set aside	
		g. Rear main bearing cap (7)	Remove and set aside	
		h. Crankshaft (8)	Lift out	
				TA127210
		i. Main bearing liners (11, 12, 13 and 14)	Remove	From cylinder block
2	Crankshaft (8)	a. Crankshaft gear (9)	Remove	Use puller
		b. Key (10)	Remove	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
3		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air or clean cloths
INSPECTION				
4		Key (10)	Inspect	Inspect for cracks, damage and wear. Replace if cracked, damaged or worn
5	Crankshaft (8)	a. Crankshaft overall	Inspect	Inspect surfaces for rough or grooved condition. Inspect for scoring, pits, cracks, damage, and evidence of overheating. If any of these conditions observed, replace crankshaft
		b. Crankshaft main bearing journals	Measure	Use micrometer. Measure front and rear of each journal. If diameters are smaller than 2.8730 inches use undersize bearing liners (0.002 inch)

NOTE

When main bearing journals are worn more than 0.002 inch, grind undersize to following dimensions:

Outer Diameter Undersize (inch)	Grind to (inches)
0.002	2.2460 to 2.2470
0.010	2.2380 to 2.2390
0.020	2.2280 to 2.2290
0.030	2.2180 to 2.2190

If one or more journals are to be ground, then grind all journals.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Crankshaft main bearing journals	Measure	Measure 90 degrees from first measurement for out-of-roundness. If out-of-roundness exceeds 0.0005 inch, regrind journal and use undersize liners.
		d. Crankshaft connecting rod journals	Measure	Use micrometer. Measure front and rear of each journal, checking taper. If taper exceeds 0.001 inch, regrind journal

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
5 (cont)				

NOTE

When connecting rod journals are worn more than 0.002 inch, grind undersize to following dimensions:

Outer Diameter Undersize (inch)	Grind to (inches)
0.002	2.2460 to 2.2470
0.010	2.2380 to 2.2390
0.020	2.2280 to 2.2290
0.030	2.2180 to 2.2190

If one or more journals are to be ground, then grind all journals.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Crankshaft connecting rod journals	Measure	Measure 90 degrees from first measurement for out-of-roundness. If out-of-roundness exceeds 0.0005 inch, regrind journal

NOTE

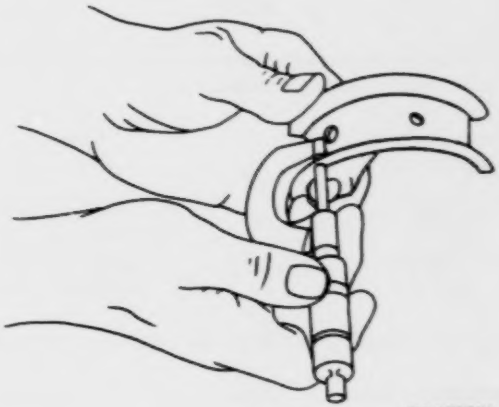
If crankshaft was reground, repeat step 5 of inspection.

STEP	LOCATION	ITEM	ACTION	REMARKS
6		Crankshaft gear (9)	Inspect	Inspect for cracks, damage, missing or broken teeth, scoring, pits and wear. If any of these conditions observed, replace gear
7	Center main bearing cap (6)	Center main bearing liners (13)	a. Remove	Slide out
			b. Inspect	Inspect for cracks, scoring, pitting, flaking, or signs of overheating. Check liner back for bright spots. Replace if any of these conditions observed
			c. Measure thrust surface thickness	Use micrometer. Replace if thickness less than 0.1025 inch

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
7 (cont)				



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STEP	LOCATION	ITEM	ACTION	REMARKS
8	Main bearing caps (4, 5, and 7)	Main bearing liners (11, 12, and 14)	a. Remove	Slide out
			b. Inspect	Inspect for cracks, scoring, pitting, flaking, or signs of overheating. Check liner back for bright spots. Replace if any of these conditions observed
9		Main bearing caps (4, 5, 6 and 7)	Inspect	Check for cracks, damage, wear, scoring, and pitting. Replace if any of these conditions observed

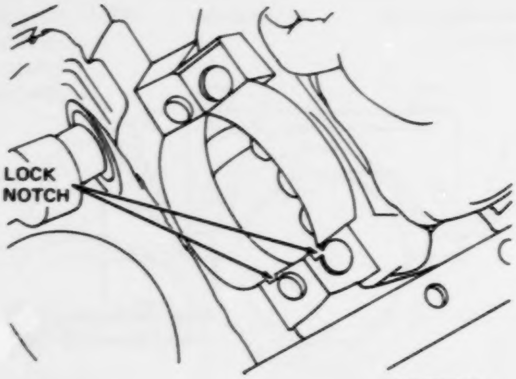
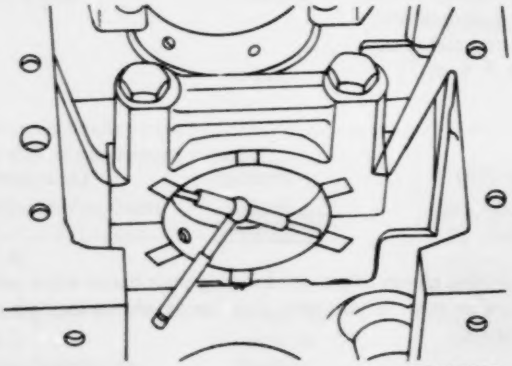
NOTE

Perform step 10 for each main bearing cap (4, 5, 6, or 7) requiring replacement. Proceed to installation (step 11) if original main bearing caps (4, 5, 6 or 7) are being installed.

STEP	LOCATION	ITEM	ACTION	REMARKS
10	Cylinder block, bottom	a. Replacement main bearing cap (4, 5, 6, or 7)	Position	In correct location. Be sure lock notches are on same side as shown

4-2. ENGINE MAINTENANCE (cont)

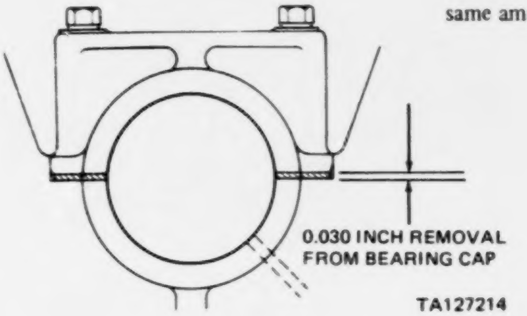
d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
10 (cont)				
		b. Two cap screws (3)	Install	Tighten to 90-100 pounds foot torque
		c. Replacement main bearing cap (4, 5, 6, or 7)	Check bore diameter	At three angular locations as shown. Diameter shall be 3.066 to 3.067 inches
				
		If bore diameter is out of tolerance or main bearing cap is shifted sidewise, perform d, below; otherwise proceed to f below.		
		d. Two cap screws (3)	Remove	

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
10 (cont)		e. Replacement main bearing cap (4, 5, 6, or 7)	Remove and rework	Rework by removing 0.030 inch stock from mating surface. Then, bore out to meet tolerance specified in c above. If 0.030 inch stock is removed, machine same amount from lock groove



NOTE

Machine new mounting surface flat so main bearing cap will set solid without wobbling in cylinder block.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Two cap screws (3) and replacement main bearing cap (4, 5, 6, or 7)	Remove	
INSTALLATION				
11	Crankshaft (8)	a. Key (10)	Position	On crankshaft

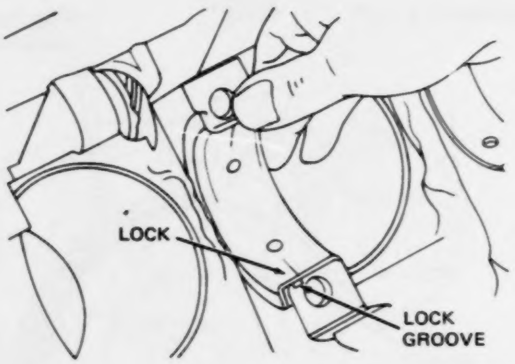
WARNING

Wear asbestos gloves to prevent burning your hands when performing following step. If you burn your hands, obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Crankshaft gear (9)	Heat and install	Use gear and bearing heater. Timing mark on gear must be outward
12	Cylinder	a. Bearing liner bore	Clean	Remove all dust, dirt or grease. Dirt left behind bearing liners will interfere with lubrication cooling resulting in hot spots and premature failure of liners

4-2. ENGINE MAINTENANCE (cont)

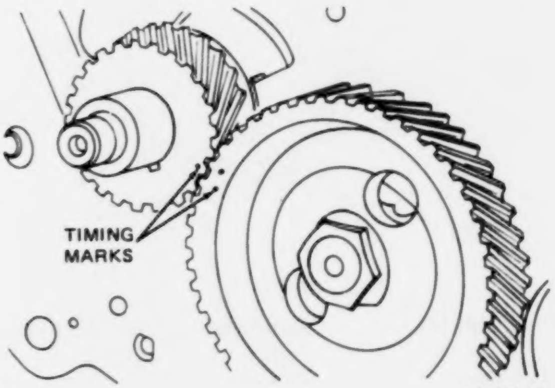
d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
12 (cont)		b. Main bearing liners (11, 12, 13, and 14)	Install	In cylinder block, with liner lock engaging lock groove in block. Slide liners in position
				
		c. Crankshaft (8)	Install and clean	Clean main bearing journals using clean, lintless cloth
		d. Plasti gage	Position	Crosswise on crankshaft main bearing journals
		NOTE Install main bearing caps in proper numbered position with numbered side of cap toward camshaft.		
		e. Main bearing liners (11, 12, 13, and 14)	Install	In respective main bearing caps (4, 5, 6, 7). Slide into position; don't press on center of liners. Be sure liner lock aligns with lock groove in main bearing cap
		f. 10 cap screws (3)	Install and remove	Tighten to 90-100 pounds foot torque, then remove
		g. Main bearing cap and liner (4, 5, 6, and 7)	Remove	
		h. Plasti gage	Measure	Flattened plasti gage located on bearing cap liner or crankshaft. Measure widest point. Bearing oil clearance shall be 0.0012 to 0.0042 inch. If necessary, install undersize bearing liner kit or grind crankshaft (inspection, step 5)

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
12 (cont)		i. Crankshaft (8)	Lift out	
		j. Bearing liner	Lubricate	Located in cylinder block bearing bores; use No. 30 oil
		k. Crankshaft (8)	Install	
		l. Crankshaft gear (9)	Check	Align timing marks on gear (9) with double marks on camshaft gear as shown

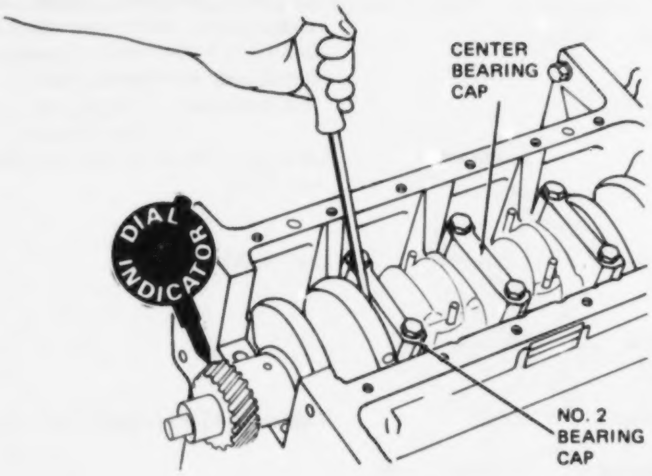


TA127216

STEP	LOCATION	ITEM	ACTION	REMARKS
13	Main bearing cap (4, 5, 6, and 7)	Bearing liner	Lubricate	Located in bore of bearing cap; use No. 30 oil
14	Crankshaft (8)	Main bearing journals	Lubricate	Use No. 30 oil
15	Cylinder block	a. Main bearing cap and liner (5, 6, and 7)	Position	
		b. Eight cap screws (3)	Install	Tighten to 90-100 pounds foot torque
		c. Crankshaft (8)	Check end play	Place dial indicator on crankshaft gear (9). Using pry bar between crank throw and bearing cap (6) take up all end play and check dial indicator reading. Maximum end play is 0.015 inch

4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
15 (cont)		 TA127217		If end play is greater than this dimension, replace center main bearing liners and recheck end play. If end play is still greater than 0.015 inch, replace crankshaft (8)
16	Connecting rod bearing cap and liner (2)	Plasti gage	Position	Clean bearing liner with clean, lintless cloth; position plasti gage crosswise on liner
17	Cylinder block	a. Crankshaft (8) connecting rod journals	Clean	Use clean, lintless cloth
		NOTE Install connecting rod bearing caps in proper numbered position with numbered side of cap towards camshaft.		
		b. Four connecting rod bearing caps (2)	Position	
		c. Eight connecting rod nuts (1)	Install and remove	Tighten to 45-50 pounds foot torque; then remove
		d. Four connecting rod bearing caps (2)	Remove	

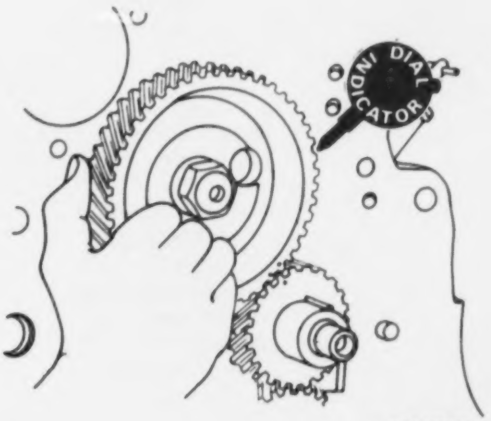
4-2. ENGINE MAINTENANCE (cont)

d. Crankshaft and Main Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
17 (cont)		e. Plasti gage	Measure	Flattened plasti gage located on bearing cap liner or crankshaft journal. Measure widest point. Oil clearance shall be 0.0010 to 0.0040 inch. If necessary, install undersize bearing liners to obtain this dimension
18	Connecting rod bearing cap (2)	Bearing liner	Lubricate	Located in bore of bearing caps; use No. 30 oil
19	Crankshaft (8)	Connecting rod journals	Lubricate	Use No. 30 oil
20	Cylinder block	a. Four connecting rod bearing caps (2)	Position	
		b. Eight connecting rod nuts (1)	Install	Tighten to 45-50 pounds foot torque
		c. Front main bearing cap (4)	Position	
		d. Oil pump	Install	Para 4-2i
		e. Crankshaft gear (9) and camshaft gear	Check backlash	Place dial indicator on camshaft gear. Backlash between gear (9) and camshaft gear shall be 0.0002 to 0.006 inch. If backlash exceeds 0.006 inch, replace gears

NOTE

Excessive backlash may also be caused by worn camshaft bushings.



TA127218

4-2. ENGINE MAINTENANCE (cont)

e. Flywheel and Flywheel Housing.

This task covers repair and replacement of the flywheel and flywheel housing consisting of:

a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS

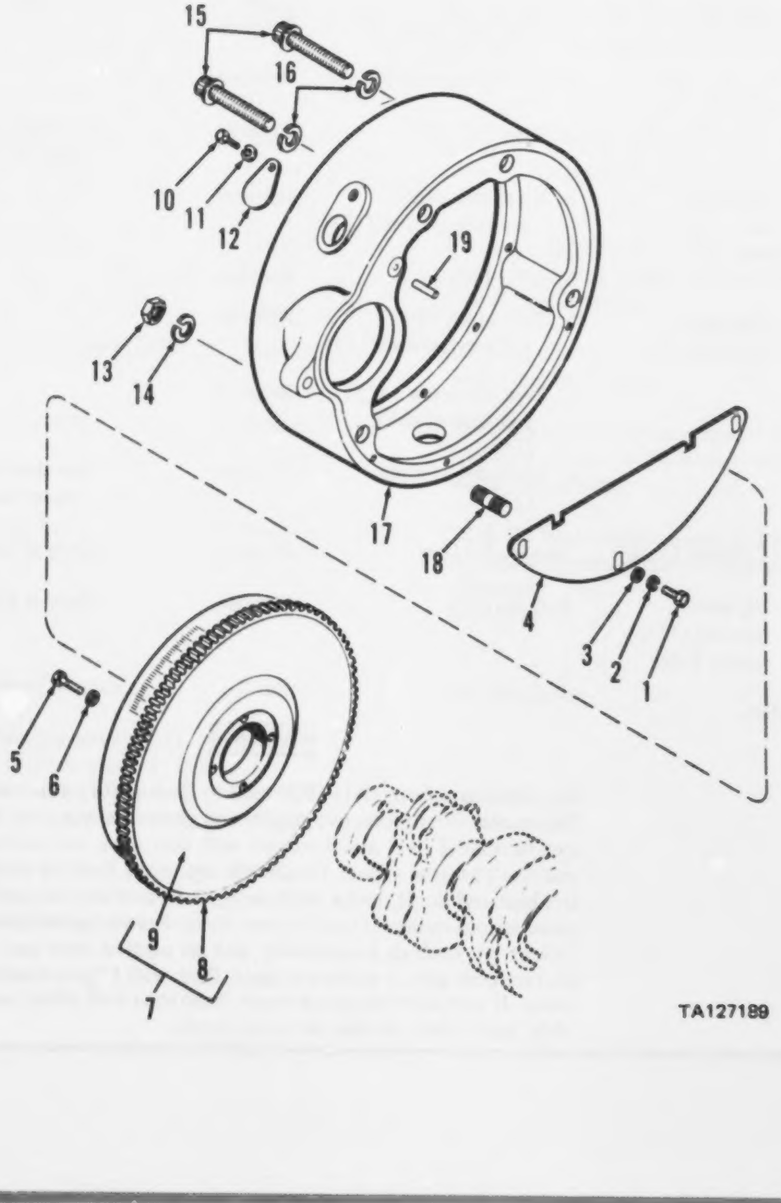
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Oven or hot oil	
Asbestos Gloves	

EQUIPMENT CONDITION

Paragraph	Condition Description
2-27a	Starter removed from engine.
3-5d	Transmission separated from engine.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

KEY
1. Cap screws
2. Lock washers
3. Washers
4. Dust cover
5. Cap screws
6. Washers
7. Flywheel assembly
8. Ring gear
9. Flywheel
10. Cap screw
11. Lock washer
12. Cover
13. Nuts
14. Lock washers
15. Cap screws
16. Lock washers
17. Flywheel housing
18. Studs
19. Roll pin



4-2. ENGINE MAINTENANCE (cont)

e. Flywheel and Flywheel Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Flywheel housing (17), front	a. Three cap screws (1) lock washers (2) and washers (3)	Remove	If necessary
		b. Dust cover (4)	Remove	If necessary
2	Flywheel assembly (7)	a. Ring gear (8)	Align timing mark with roll pin (19)	Insert screwdriver into timing hole in flywheel housing and engage ring gear teeth to move gear to align
		b. Four cap screws (5) and washers (6)	Remove	
		c. Flywheel assembly (7)	Remove	
		d. Ring gear (8)	Remove	Use drift to drive off flywheel (9) only if gear requires replacement
3	Flywheel housing (17), top	a. Cap screw (10) and lock washer (11)	Remove	
		b. Cover (12)	Remove	
4	Flywheel housing (17), rear	a. Two nuts (13) and lock washers (14)	Remove	
		b. Two cap screws (15) and lock washers (16)	Remove	
		c. Flywheel housing (17)	Remove	Use chain hoist securely fastened to flywheel housing
5	Cylinder block	Two studs (18)	Remove	Only if damaged
6	Flywheel housing (17), timing hole	Roll pin (19)	Remove	Only if damaged

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

4-2. ENGINE MAINTENANCE (cont)

e. Flywheel and Flywheel Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
7		All parts	Clean	Use cleaning solvent P-D-680. Dry with moisture free compressed air or clean cloth
INSPECTION				
8		Ring gear (8)	Inspect	Check for missing or chipped gear teeth or cracks; replace if any of these conditions observed
9		Flywheel (9)	Inspect	Check for damage, wear, and elongated mounting holes; replace if any of these conditions observed
10		Flywheel housing (17)	Inspect	Check for cracks or other damage. Replace if cracked or damaged
11	Flywheel housing (17)	Roll pin (19)	Inspect	Check for bent condition; replace if bent. Tap new roll pin into position until seated in bottom of hole
12	Cylinder block	Studs (18)	Inspect	Check for bent condition and deformed or damaged threads; replace if bent or threads damaged
INSTALLATION				
13	Cylinder block	Flywheel housing (17)	Position	Use chain hoist
14	Flywheel housing (17), rear	a. Two cap screws (15) and lock washers (16) b. Two nuts (13) and lock washers (14)	Install Install	
15	Flywheel housing (17), top	a. Cover (12) b. Cap screw (10) and lock washer (11)	Position Install	

4-2. ENGINE MAINTENANCE (cont)

e. Flywheel and Flywheel Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				

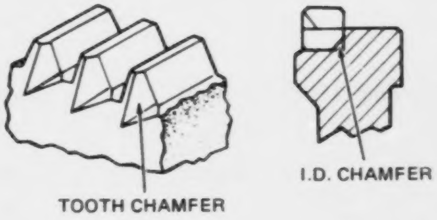
CAUTION

In following step don't use torch to preheat ring gear.

WARNING

Wear asbestos gloves to prevent burning your hands when handling heated parts.

STEP	LOCATION	ITEM	ACTION	REMARKS
16	Flywheel assembly	a. Flywheel (9)	Position	On work bench
		b. Ring gear (8)	Preheat and install	Use oven or hot oil; heat to 400-450 degrees F. Install on flywheel (9) with chamfer side of gear teeth outward and larger inside diameter chamfer toward flywheel



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STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Flywheel assembly (7)	Position	On crankshaft; same position of timing mark as noted during disassembly
		d. Four cap screws (5) and washers (6)	Install	Tighten to 65-70 pounds foot torque
17	Flywheel housing (17), front	a. Dust cover (4)	Position	
		b. Three cap screws (1) lock washers (2) and washers (3)	Install	

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods.

This task covers repair and replacement of pistons and connecting rods consisting of:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation

INITIAL SETUP

TOOLS

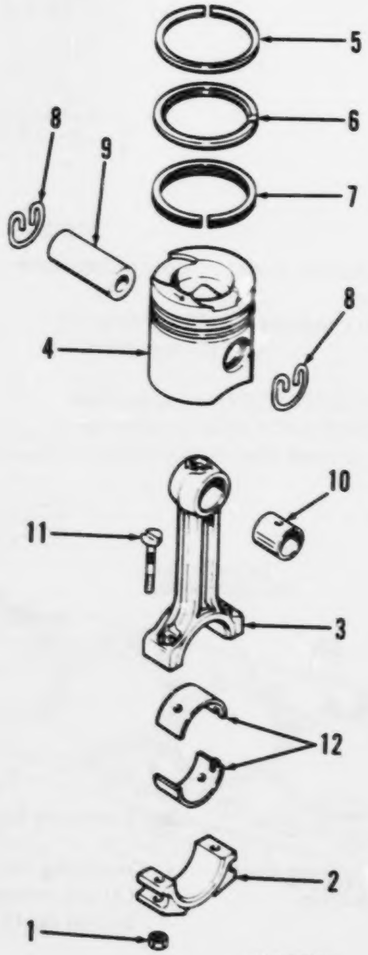
Piston Ring Expander	
Thickness Gage	NSN 5120-00-221-1999
Plastic Scraper	
Wood Dowel, 1 inch diameter	
Reamer	
Bore Gage, zero to 5 inches	
Micrometer, zero to 5 inches	
Piston Ring Compressor	
Plasti Gage	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Sleeve, 1-5/16 inches diameter	
Groove Cleaning Tool	

MATERIALS/PARTS

Capscrew, 1/2-13 UNC, grade 5, 1-1/4 inches long	FSCM 10988 P/N 13-820
Flat washer, 9/16 inch ID, 1-3/8 inches OD, 7/64 inch thick	FSCM 10988 P/N 95-8
Cleaning solvent P-D-680	
Clean cloths	
Oil, No. 30	
Piston rings	

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5k	Oil pan removed.
3-5g	Cylinder head assembly removed.



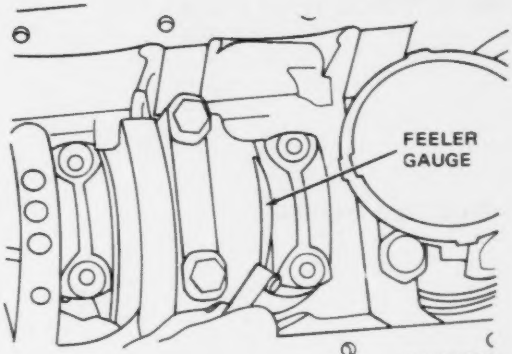
KEY

1. Connecting rod nuts
2. Connecting rod cap
3. Connecting rod
4. Piston
5. Top piston ring
6. Second piston ring
7. Piston oil ring
8. Retaining rings
9. Piston pin
10. Piston pin bushing
11. Screws
12. Bearing liners

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Cylinder block, bottom	Four connecting rods (3)	Check side clearance	Use feeler gauge. If clearance exceeds 0.011 inch, replace connecting rod



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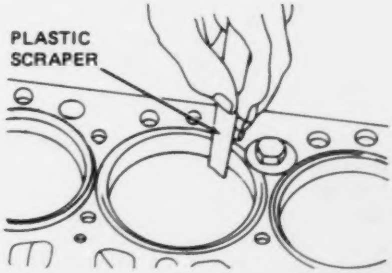
STEP	LOCATION	ITEM	ACTION	REMARKS
2	Cylinder block, top	Four piston sleeves	Check	Inspect for carbon or metal ridge at top of ring travel. Use plastic scraper to remove carbon ridge. If a metal ridge has formed, replace piston sleeve (para 4-2a)



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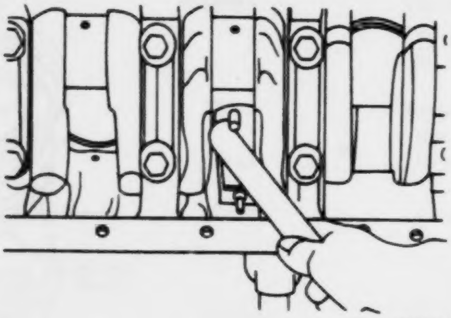
CAUTION

Don't use sharp instruments to remove carbon ridge.

STEP	LOCATION	ITEM	ACTION	REMARKS
3	**Cylinder block, bottom**	**a. Connecting rod (3) and connecting rod cap (2)**	**Check**	**Check connecting rods and caps for numbers as to location in cylinder block. If not, number rods and caps for reinstallation in original location**

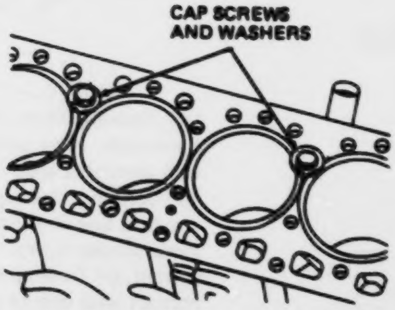
4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
3 (cont)		b. Two connecting rod nuts (1)	Remove	Turn crankshaft to gain access to connecting rod caps (2)
		c. Connecting rod cap (2)	Remove and set aside	
		d. Connecting rod (3)	Push up	Use wooden dowel to push connecting rod up through block
		 TA127222		
4	Cylinder block, top	a. Piston (4) and connecting rod (3)	Remove	
		b. Connecting rod cap (2) and two nuts (1)	Install	On corresponding connecting rod to avoid mixing caps (2)
		c. Piston sleeve	Secure	Install cap screw (FSCM 10988 P/N 13-820) and washer (FSCM 10988 P/N 95-8) in cylinder block to hold sleeve in position

NOTE

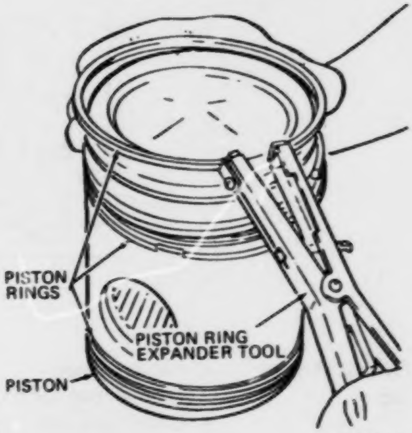
Repeat steps 3 and 4 above for three remaining connecting rods (3).



TA127223

4-2. ENGINE MAINTENANCE (cont)

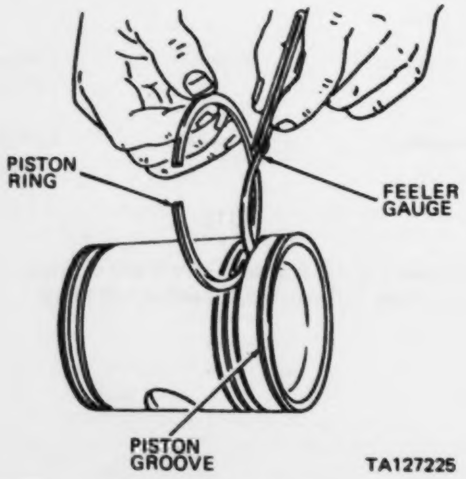
f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
		CAUTION Use piston ring expander to remove rings to avoid damaging piston and ring.		
5	Piston (4)	a. Top piston ring (5)	Remove and discard	Use piston ring expander  TA127224
		b. Second piston ring (6)	Remove and discard	
		c. Piston ring (7)	Remove and discard	
		d. Two retaining rings (8)	Remove	Use needle nose pliers
		e. Piston pin (9)	Remove and set aside	
		f. Connecting rod (3)	Remove and set aside	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immedately, and obtain medical aid immediately.		

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
		WARNING Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.		
6		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air or clean cloth
7	Piston (4)	a. Overall	Clean	Remove carbon from piston using care not to scratch piston
		b. Piston ring groove	Clean	Use groove cleaning tool
		c. Piston oil hole	Clean	Use small drill or fine wire
INSPECTION				
8	Piston(4)	a. Overall	Inspect	Inspect for cracks, damage, scoring, evidence of overheating and damaged ring grooves. If any of these conditions observed, replace piston
		b. Piston pin bore diameter	Measure	Use bore gage and measure two places, 90 degrees apart. Replace piston if diameter is greater than 1.2508 inches
		c. Oil ring side clearance	Measure	Use feeler gauage. If measurement exceeds 0.005 inch, replace piston



4-2. ENGINE MAINTENANCE (cont)

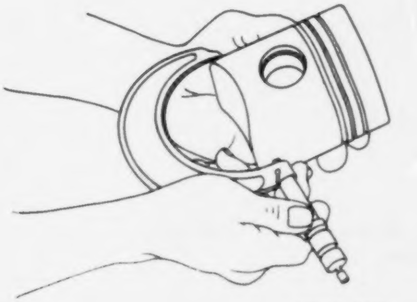
f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
8 (cont)		d. Second piston ring side clearance	Measure	Use feeler gauge. If measurement exceeds 0.008 inch, replace piston

NOTE

Top piston ring clearance cannot be checked.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Piston diameter	Measure	Use micrometer. Measure across thrust face at bottom of piston, perpendicular to piston pin holes, as shown. If piston diameter is less than 3.9940 inches, replace piston



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STEP	LOCATION	ITEM	ACTION	REMARKS
9	Piston pin (9)	Outside diameter	Measure	Use micrometer. Replace if measurement is less than 1.2495 inches
10		Retaining ring (8)	Inspect	Check for damage and loss of resiliency. Replace if damaged or resiliency is lost

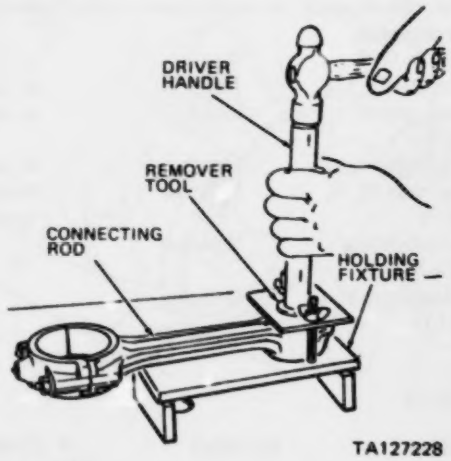
NOTE

Replace connecting rod as an assembly if side clearance check, performed in step 1 of removal, exceeded 0.011 inch.

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
11		Connecting rod (3) and connecting rod cap (2)	Inspect	Check for cracks, damage, wear, scoring, and pitting. If any of these conditions observed, replace as an assembly
12	Connecting rod (3)	a. Piston pin bushing (10)	Measure inside diameter	Use bore gage, then measure bore gage with micrometer. Replace if measurement is greater than 1.2510 inches
		NOTE Perform following step only if piston pin bushing requires replacement.		
		b. Piston pin bushing (10)	Replace	Use 1-5/16 inches diameter sleeve or rod to press from connecting rod. Align oil hole in replacement bushing with oil hole in connecting rod before pressing bushing in. Press until flush with rod. Ream bushing to 1.2502-1.2504 inches if new piston pin is to be installed; if old piston pin is used, ream bushing 0.0004 to 0.0015 inch larger than piston pin diameter



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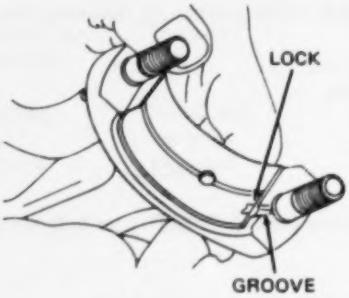
4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
12 (cont)		**NOTE** Avoid mixing liners (12), connecting rods (3), and connecting rod caps (2). Inspect one group at a time.		
		c. Connecting rod nuts (1) and screws (11)	Remove	Check for damaged threads and distortion; if distorted or threads damaged replace part
		d. Bearing liners (12)	Remove and inspect	Slide liners out. Check for scoring, pitting, flaking, cracking, or signs of overheating. Replace if any of these conditions observed
		e. Connecting rod cap (2), screws (11), and nuts (1)	Install	On corresponding connecting rod (3) to avoid mixing caps (2)
REASSEMBLY				
13	Piston (4)	a. Connecting rod (3)	Position	In piston. Numbered side of rod facing toward arrow side of piston
		b. Piston pin (9)	Install	Use hand pressure
		c. Two retaining rings (8)	Install	Use needle nose pliers
		CAUTION Use piston ring expander to install piston rings to prevent damaging rings or piston.		
		d. Piston oil ring (7)	Install	In piston third groove
		e. Second piston ring (6)	Install	In piston second groove
		f. Top piston ring (5)	Install	In piston first groove
		g. Piston rings (5, 6, and 7)	Position	Rotate so that ring end gaps are 120 degrees apart
		h. Two connecting rod nuts (1)	Remove	
		i. Connecting rod cap (2)	Remove	

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">REASSEMBLY (cont)</td></tr>
<tr><td>14</td><td>Connecting rod (3)</td><td>Bearing liner (12)</td><td>Install</td><td>Slide liner (12) into position, don't push in on center of liner. Be sure liner lock engages connecting rod lock groove</td></tr>
<tr><td colspan="5">

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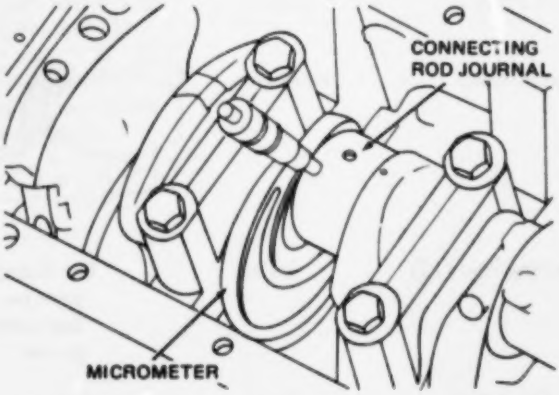
<tr><td colspan="5">INSTALLATION</td></tr>
<tr><td>15</td><td>Cylinder block, bottom</td><td>Crankshaft</td><td>a. Measure connecting rod journals taper
b. Measure connecting rod journals</td><td>Measure front and rear to check taper. Refinish journals if taper exceeds 0.001 inch (para 4-2d)
Measure 90 degrees from above check points. If out-of-roundness exceeds 0.0005 inch refinish journals (para 4-2d)</td></tr>
<tr><td colspan="5">

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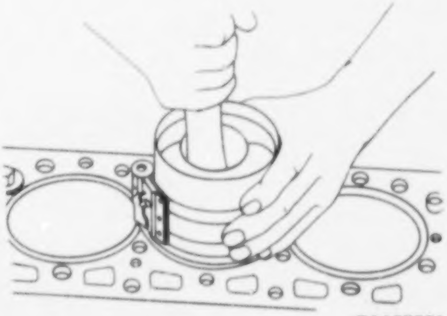
<tr><td>16</td><td>Piston (4)</td><td>Piston rings (5, 6, 7), and piston (4)</td><td>Lubricate</td><td>Use No. 30 oil</td></tr>
<tr><td>17</td><td>Cylinder block, top</td><td>a. Cylinder sleeves</td><td>Lubricate</td><td>Use No. 30 oil</td></tr>
</table>

4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
17 (cont)		**NOTE** Check that stamped arrow on top of piston (4) is pointed towards front of engine and numbers on bearing end of connecting rods (3) face camshaft when performing following step.		
		b. Piston (4) and connecting rod (3)	Position	In cylinder bore, halfway in
		NOTE Check that piston rings (5, 6, and 7) are fully seated in piston (4) grooves.		
		c. Piston ring compressor tool	Install and tighten	On piston (4). Tighten a little at a time, making sure piston rings are free to compress
		d. Piston (4)	Install	Gently tap down into cylinder block bore using wooden dowel
		e. Piston ring compressor tool	Remove	
18	Connecting rod cap (2)	Bearing liner (12)	Install	Use sliding movement to install; don't press on center of liner. Be sure bearing liner lock is aligned with cap (2) lock groove
19	Cylinder block, bottom	a. Crankshaft	Clean	Connecting rod journals; use clean cloth
		b. Plasti gage	Position	Crosswise on connecting rod cap liner (12)



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4-2. ENGINE MAINTENANCE (cont)

f. Pistons and Connecting Rods (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
19 (cont)		**NOTE** In following step, be sure number on connecting rod cap (2) matches number on connecting rod (3).		
		c. Connecting rod cap (2) and bearing liner (12)	Position	
		d. Two connecting rod nuts (1)	Install and remove	Tighten to 45-50 pounds foot torque, then remove
		e. Connecting rod cap (2)	Remove	
		f. Plasti gage	Measure	Flattened plasti gage located on bearing liner (12) or crankshaft connecting rod journal. Clearance shall be between 0.0010 to 0.0040 inch. Install undersize bearing liner kit and regrind crankshaft journals (para 4-2d) if clearance exceeds 0.0040 inch
		g. Crankshaft connecting rod journals	Lubricate	Use No. 30 oil
		h. Connecting rod cap (2), bearing liners (12)	Lubricate and position cap	Use No. 30 oil; be sure numbers on caps (2) and connecting rod (3) match
		i. Two connecting rod nuts (1)	Install	Tighten to 45-50 pounds foot torque
20	Cylinder block, top	Cylinder liner retaining cap screws and washers	Remove	Installed in step 4c of removal

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings.

This task covers replacement of the camshaft and bearings consisting of:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection and Repair
e. Reassembly
f. Installation

INITIAL SETUP

TOOLS
Metal Rod, 1/2 inch diameter by 4 feet long
Clothespins
Wooden Dowels, 3/8 inch diameter by 12 inches long (eight required)
Micrometer, zero to 5 inches
Bore Gage, zero to 5 inches
Asbestos Gloves
Dial Indicator
Gear and Bearing Heater
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

SPECIAL TOOLS
Camshaft Bushing Tool Kit FSCM 10988 P/N A41103

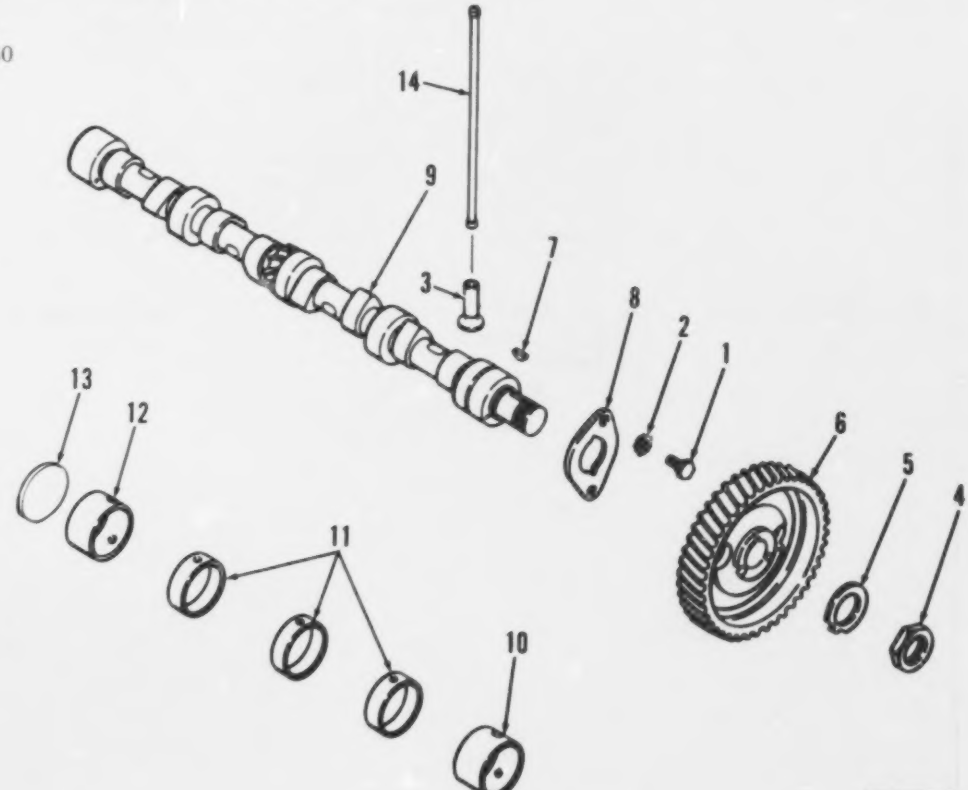
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Oil, No. 30

EQUIPMENT CONDITION

Paragraph	Condition Description
2-14e	Exhaust manifold removed.
2-17e	Water pump removed.
3-6a	Fuel injector fittings disconnected.
3-5j	Rocker arm assembly removed.
3-5f	Tachometer drive removed.
3-5k	Oil pan removed.
4-2h	Timing gear cover removed.
4-2e	Flywheel and flywheel housing removed.
4-2d	Crankshaft removed.

KEY

1. Thrust plate bolts
2. Lock washers
3. Valve tappet
4. Camshaft nut
5. Lock
6. Camshaft gear
7. Key
8. Camshaft thrust plate
9. Camshaft
10. Front camshaft bushing
11. Center and intermediate camshaft bushings
12. Rear camshaft bushing
13. Cup plug
14. Push rods



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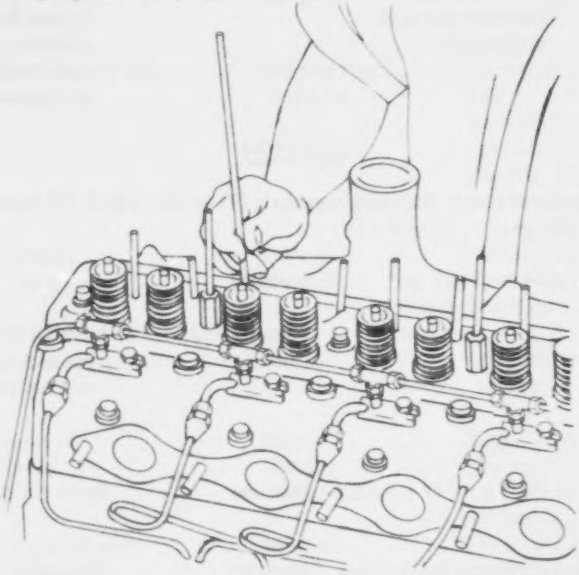
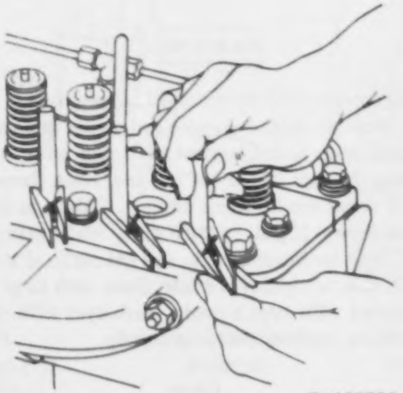
4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Cylinder head, top	a. Eight push rods (14)	Remove	
		 TA127233		
		b. Eight valve tappets (3)	Lift and retain	Insert 3/8 inch diameter by 12 inches long wood dowels (eight) in push rod openings and push into valve tappets hole. Raise valve tappets with dowels and retain in position with clothespins
		 TA127234		

4-2. ENGINE MAINTENANCE (cont)

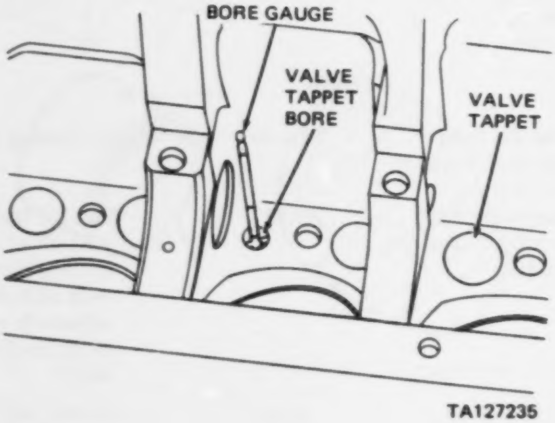
g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
2	Cylinder block, front	a. Two thrust plate bolts (1) and lock washers (2)	Remove	Align holes in camshaft gear with bolts (1) by installing crankshaft pulley nut on crankshaft. Then, using socket and handle turn crankshaft gear until holes and bolts are aligned
		CAUTION Be careful when removing camshaft (9) so that you don't damage bushings (10, 11, and 12)		
		b. Camshaft (9) and camshaft gear (6)	Remove	
		c. Eight valve tappets (3)	Number and remove	Number tappets (3) and their respective holes in cylinder block to ensure correct reinstallation
DISASSEMBLY				
3		Camshaft nut (4) and lock (5)	Remove	Bend tab of lock up, away from nut (4)
4		Camshaft gear (6)	Remove	Use puller
5		Key (7)	Remove	
6		Camshaft thrust plate (8)	Remove	
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
7		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR				
8	Camshaft (9)	a. Overall	Inspect	Check surfaces for wear, damage, and scoring. If any of these conditions observed, replace camshaft
		b. Bearing surfaces	Measure front and rear	Use micrometer. Measure each bearing surface in four places. Measure front and rear surfaces again, 90 degrees from first measurement. If outer diameter of any bearing surface is less than 1.748 inches, replace camshaft.
9	Camshaft thrust plate (8)	a. Overall	Inspect	Replace if cracked, damaged or worn
		b. Thickness	Measure	Use micrometer. Replace if thickness is less than 0.147 inches
10		Camshaft gear (6)	Inspect	Replace if cracked, or if teeth damaged or missing
11	Valve tappet (3)	a. Overall	Inspect	Replace if cracked, damaged or worn
		b. Stem	Measure outer diameter	Replace if less than 0.5605 inch
12	Cylinder block, bottom	a. Valve tappet bores	Measure inside diameter	Use bore gage. Replace cylinder block if greater than 0.5650 inch

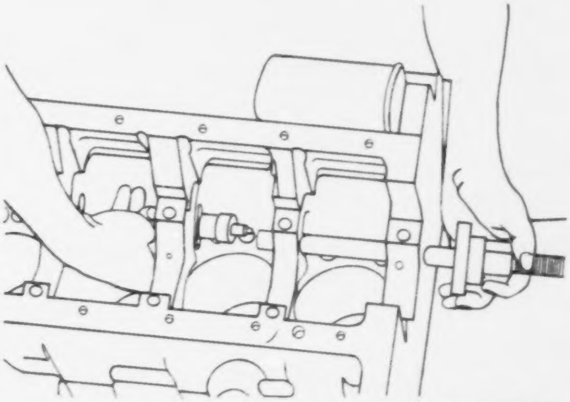


		b. Camshaft bushings (10, 11, and 12)	Measure inside diameter	Use bore gage and measure in two places, 90 degrees apart. Replace if greater than 1.755 inches

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
12 (cont)		**NOTE** If camshaft bushings (10, 11 and 12) require replacement, perform steps 13, 14 and 15 below, otherwise proceed to reassembly.		
13	Cylinder block, rear	Cup plug (13)	Remove	Insert rod into block through camshaft bushings and tap plug out; discard plug
14	Cylinder block, bottom	a. Intermediate and center camshaft bushings (11)	Remove	Insert bushing puller tool into cylinder block to remove. Use open end adjustable wrench to turn nut and draw bushing out. See illustration below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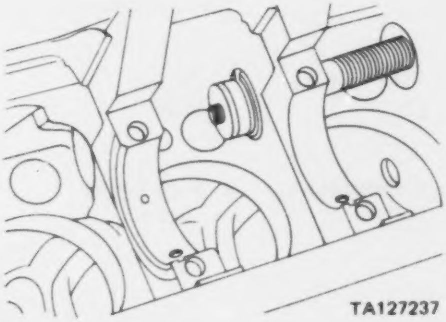
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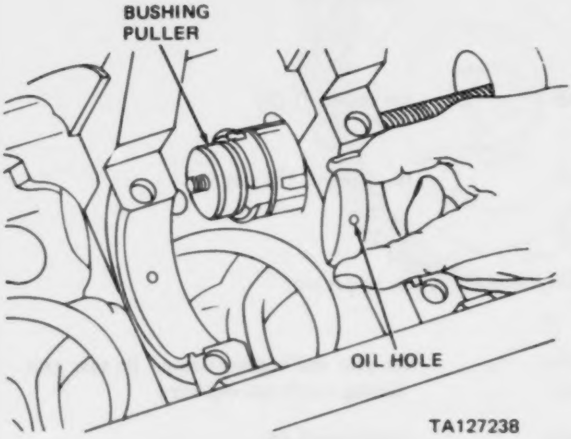
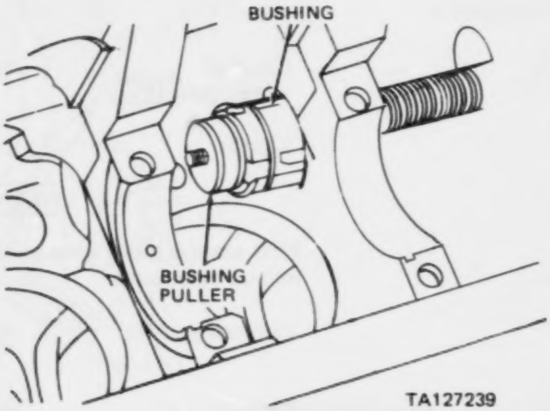
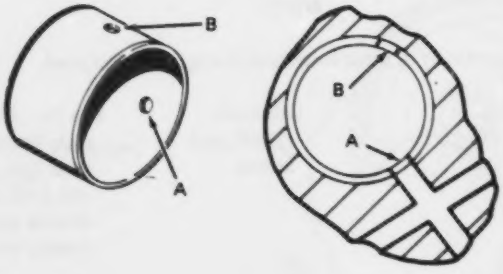
STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Rear and front camshaft bushings (10 and 12)	Remove	Use bushing puller tool
		c. Intermediate and center camshaft bushing (11)	Install	Place 1/2 inch wide bushing on puller tool with offset oil hole in bushing toward front of block and bushing oil hole aligned with oil hole in block. Use open end adjustable wrench and pull bushing into block until flush with forward face of block

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
14 (Cont)				
 BUSHING PULLER OIL HOLE TA127238  BUSHING BUSHING PULLER TA127239				
		d. Front camshaft bushing (10)	Install	Place 1-7/32 inches wide bushing on tool with offset oil holes towards front of block and oil hole A aligned with oil hole in block. Use open end adjustable wrench and pull bushing into block until 1/32 inch below front face of block
 B A B A TA127240				
		e. Rear camshaft bushing (12)	Install	Place 1-7/32 inches wide bushing on tool with offset oil holes towards front of block and aligned with oil holes in block. Use open end adjustable wrench and pull bushing into block until 5/16 inch below rear face of block

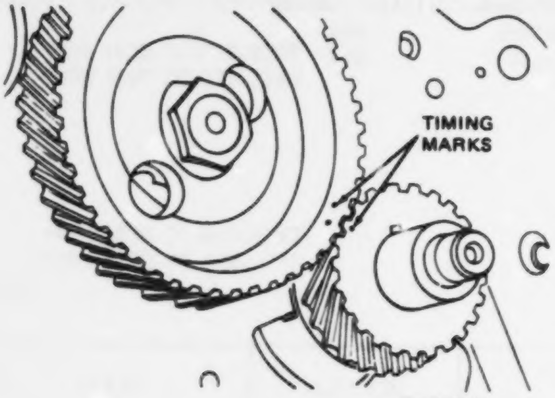
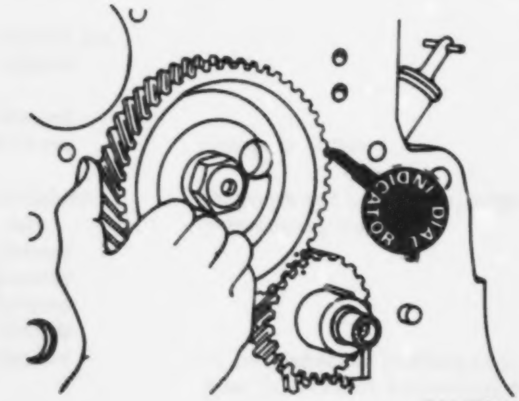
4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION AND REPAIR (cont)				
15	Cylinder block, rear	Plug cup (13)	Install	Apply permatex No. 2 to outer diameter and tap into position until it bottoms against seat
REASSEMBLY				
16		Camshaft thrust plate (8)	Install	On camshaft (9)
17		Key (7)	Install	In camshaft (9) slot
		WARNING Wear asbestos gloves when performing following steps to prevent burning your hands.		
18		Camshaft gear (6)	Heat and install	Use gear and bearing heater. Be sure gear timing marks are outward
19		Lock (5)	Position	On camshaft (9)
20		Camshaft nut (4)	Install	Tighten to 80-90 pounds foot torque
21		Lock (5)	Bend	Over one flat of nut (4)
INSTALLATION				
		NOTE Install tappets (3) in same locations as originally installed.		
22	Cylinder block, bottom	Eight valve tappets (3)	Lubricate, install, and secure	Use No. 30 oil. Insert wood dowels (3/8 inch diameter by 12 inches long) into push rod openings in top of cylinder head and push into stem of valve tappets. Lift dowels and valve tappets and retain dowels with clothespins
23	Cylinder block, front	a. Camshaft gear (6) and camshaft (9)	Lubricate, install and align	Use No. 30 oil and lubricate camshaft thrust plate (8), all bearing surfaces and lifter cams. Align holes in camshaft gear with holes in thrust plate (8)
		b. Two lock washers (2) and thrust plate bolts (1)	Install	

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
23 (cont)		c. Camshaft gear (6)	Align timing marks	
		 TA127241		
		d. Two thrust plate bolts (1)	Tighten	To 17-20 pounds foot torque
		e. Camshaft gear (6)	Check backlash	Use dial indicator as shown. Backlash must be 0.002 to 0.006 inches. If backlash exceeds 0.006 inch, replace gears
	NOTE Excessive backlash may also be caused by worn camshaft bushings.		 TA127242	

4-2. ENGINE MAINTENANCE (cont)

g. Camshaft and Bearings (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
24	Cylinder head, top	a. Clothes pins and dowels	Remove	
		b. Eight push rods (14)	Install	

4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover.

This task covers replacement of the timing gear cover consisting of:

- a. Removal
- b. Cleaning
- c. Inspection
- d. Installation

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Micrometer, zero to 5 inches	
Dial Indicator	FSCM 45225 P/N CAS 10066A
Bore Gage, zero to 5 inches	
Universal Gear Puller	NSN 5120-00-378-4298
Torque Wrench	NSN 5120-00-221-7983
Feeler Gauge	

EQUIPMENT CONDITION

Paragraph	Condition Description
2-17e	Water pump removed.
3-6c	Fuel injection pump removed.
3-5k	Oil pan removed.

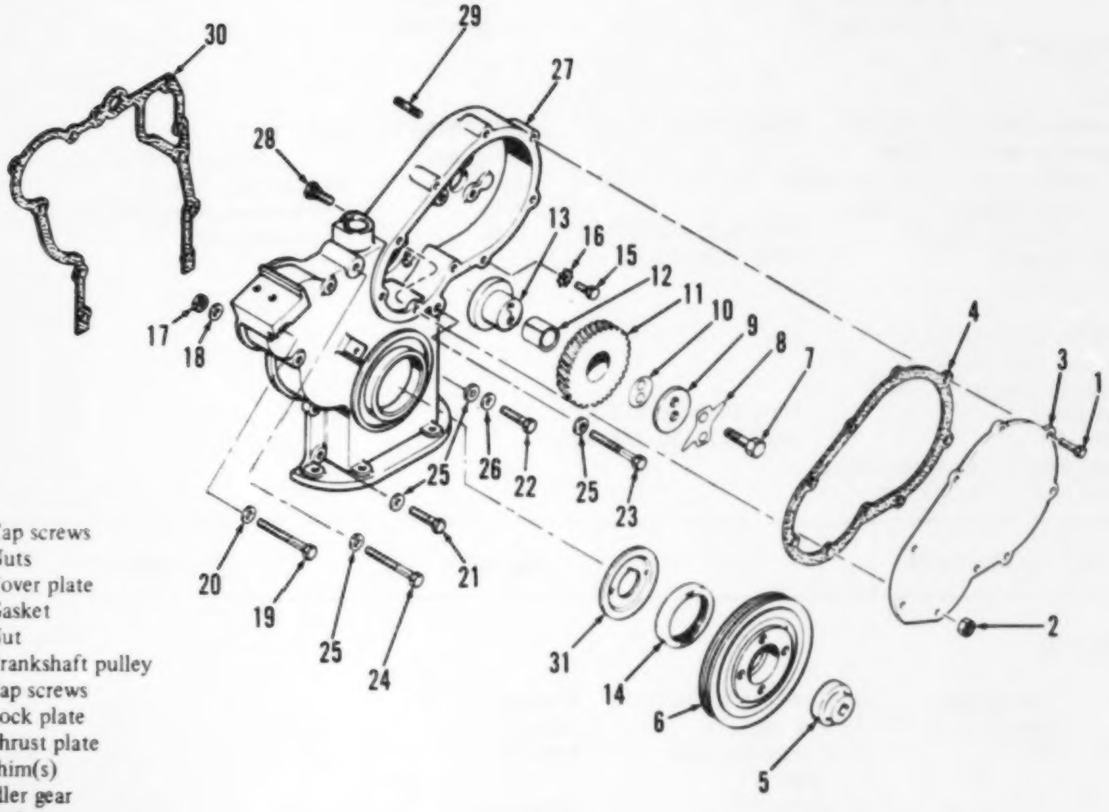
MATERIALS/PARTS

Sleeve, 2 inch diameter	
Cleaning solvent P-D-680	
Permatex 2	NSN 8030-00-873-4792
Oil No. 30	NSN 5120-00-378-4293
Timing gear cover plate gasket	
Timing gear cover gasket	

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Timing gear cover plate (3)	a. Seven cap screws (1)	Remove	
		b. Two nuts (2)	Remove	
		c. Timing gear cover plate (3)	Remove	
		d. Gasket (4)	Remove and discard	
2	Crankshaft pulley (6)	a. Nut (5)	Remove	
		b. Crankshaft pulley (6)	Remove	Use gear puller
3	Idler gear (11)	a. Lock plate (8)	Straighten tabs	Use punch and hammer to straighten tabs, releasing cap screws (7)
		b. Two cap screws (7)	Remove	
		c. Lock plate (8)	Remove	
		d. Thrust plate (9)	Remove	
		e. Shim(s) (10)	Remove	
		f. Idler gear (11) and bushing (12)	Remove	Do not separate bushing (12) from gear (11) unless inspection requires replacement

4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).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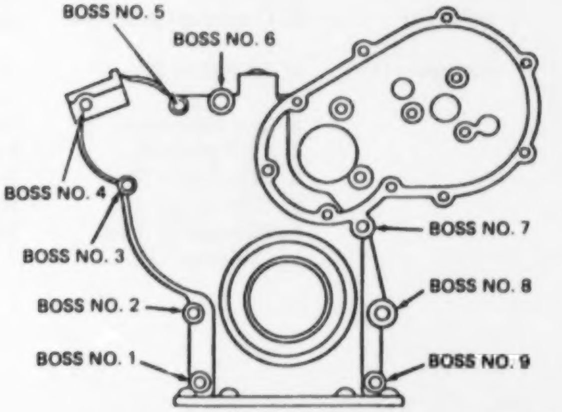
KEY

1. Cap screws
2. Nuts
3. Cover plate
4. Gasket
5. Nut
6. Crankshaft pulley
7. Cap screws
8. Lock plate
9. Thrust plate
10. Shim(s)
11. Idler gear
12. Bushing
13. Idler gear hub
14. Oil seal
15. Cap screws
16. Lock washers
17. Nuts
18. Washers
19. Cap screws
20. Washers
21. Cap screws
22. Cap screw
23. Cap screw
24. Cap screw
25. Washers
26. Washer
27. Timing gear cover
28. Studs
29. Studs
30. Gasket
31. Oil slinger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BOSS NO. 2
BOSS NO. 1
BOSS NO. 9

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4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

NOTE

Do not damage aluminum wall of timing gear cover (27) while separating oil seal (14) in the following step.

5	Timing gear cover (27)	a. Oil Seal (14)	Drive deeper onto shaft	Use 2" diameter sleeve
		b. Timing gear cover (27) with Idler gear hub (13)	Remove	Use care not to damage aluminum Timing gear cover (27)
		c. Gasket (30)	Remove and discard	

NOTE

Idler gear hub (13) is press fitted in aluminum. Do not perform next step (d.) unless inspection requires replacement.

		d. Idler gear hub (13)	Remove	Push out from rear (engine side) of timing gear cover (27)
		e. Two studs (28)	Remove	Only if necessary
		f. Three studs (29)	Remove	Only if necessary
5	Crankshaft	a. Oil seal (14)	Remove and discard	
		b. Oil slinger (31)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin o. clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

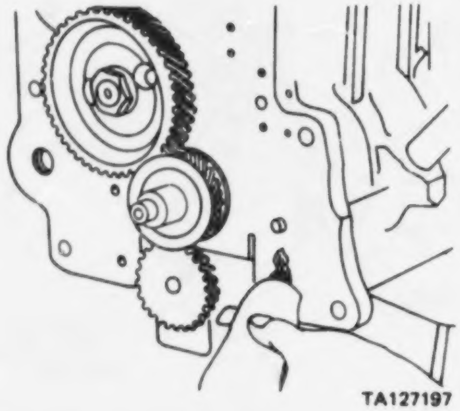
4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
6		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air or clean cloth
7		Idler gear (11) and bushing (12)	Inspect	Inspect gear for damage, distortion, and missing or broken teeth. Check gear teeth for pitting. If any of these conditions observed replace gear and bushing as an assembly. Use bore gage and measure inside diameter of idler gear bushing. Measure bore gage using micrometer. If bushing inside diameter is more than 1.377 inches, replace gear and bushing as an assembly
8		Idler gear hub (13)	Inspect	Inspect for cracks, pitting, and distortion. Replace if any of these conditions observed. Use micrometer and measure outside diameter of hub shaft. Diameter must be not less than 1.3740 inches; replace part if diameter is less than this dimension
9		Timing gear cover (27)	Inspect	Inspect for cracks and distortion; replace if cracked or distorted. Check threads on studs (28 and 29) for damage; if threads are damaged or if studs bent replace studs. Replace stud (28) by driving it out of cover using soft hammer, insert new stud in cover, install 3/8-16 nut, and tighten nut to draw stud into mounting hole. Remove nut. Replace stud (29) by unscrewing it and installing new stud
10		All other parts	Inspect	Check for cracks, damage, and distortion; replace part if any of these conditions observed
INSTALLATION				
11	Crankshaft	Oil slinger (31)	Install	On end of crankshaft. Cupped surface toward crankshaft gear. Align notch on oil slinger with keyway on crankshaft

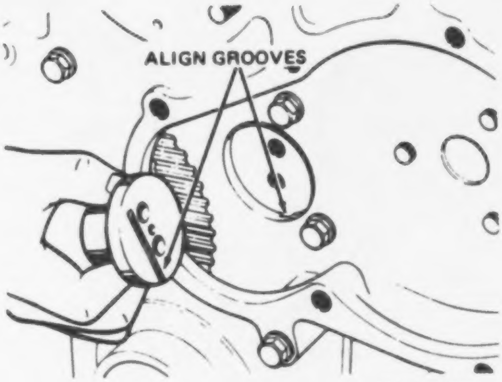
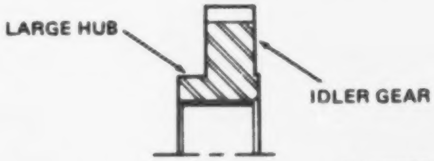
4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
12	Cylinder block	a. Cylinder block	Coat	Apply Permatex 2 on both sides of cylinder block from lower mounting hole, downwards
		 TA127197		
		b. Gasket (30)	Install and coat	Apply Permatex 2 to open face of gasket from lower mounting hole, downwards
13	Cylinder block	Timing gear cover (27)	Position	
14	Timing gear cover (27)	a. Cap screw (21) and washer (25)	Install	1-1/4 inch long cap screw; install in cover boss 1, 2, and 9. Tighten to 25-30 pounds foot torque
		b. Three cap screws (19), washers (20), washers (18), and nuts (17)	Install	3-1/4 inch long cap screw; install in cover boss 3, 4, and 5. Tighten to 25-30 pounds foot torque
		c. Cap screw (22) and two washers (25 and 26)	Install	1-1/2 inch long cap screw; install in cover boss 8. Tighten to 25-30 pounds foot torque
		d. Cap screw (23) and washer (25)	Install	2-3/4 inch long cap screw; install in cover boss 7. Tighten to 25-30 pounds foot torque
		e. Cap screw (24) and washer (25)	Install	3 inch long cap screw; install in cover boss 6. Tighten to 25-30 pounds foot torque
		f. Two cap screws (15) and lock washers (16)	Install	Tighten to 25-30 pounds foot torque
		g. Gasket (30)	Trim	Cut off any protruding gasket from bottom of cylinder block. Gasket must be flush with cylinder block

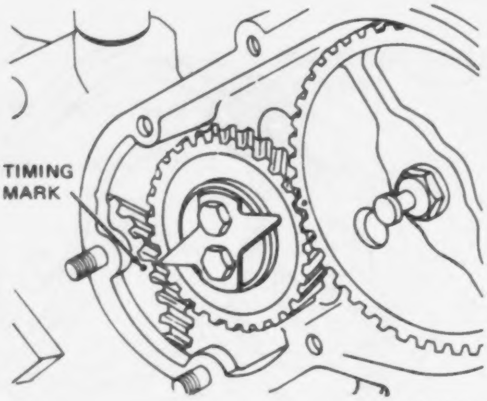
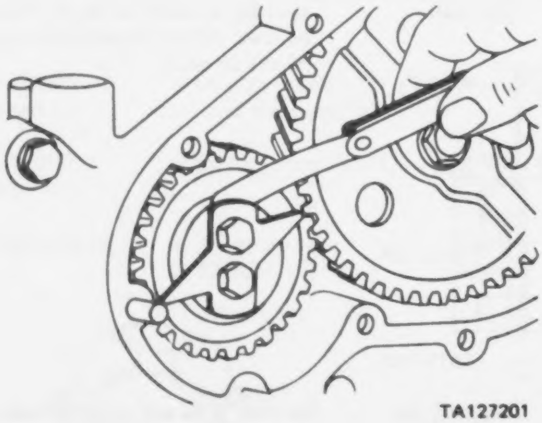
4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
15	Idler	a. Idler gear hub (13)	Align and install	Align hub oil groove with groove in cylinder block
		 TA127198		
		b. Idler gear (11) and bushing (12)	Lubricate and install	Use clean engine oil. Face large hub side toward cylinder block
		 TA127199		
16	Lock plate (8)	a. Cap screw (7)	Install	In lock plate
		b. Thrust plate (9)	Install	On lock plate
		c. Shim(s) (10)	Install	Install enough shims on thrust plate to maintain a running clearance of 0.003 inch between thrust plate (9) and idler gear (11)
17	Idler gear hub (13)	a. Lock plate (8), thrust plate (9), shim(s) (10), and cap screw (7)	Install	
		b. Lock plate (8)	Align	With engine on top dead center and number one cylinder on compression stroke, lock plate point must be aligned with timing mark on camshaft gear

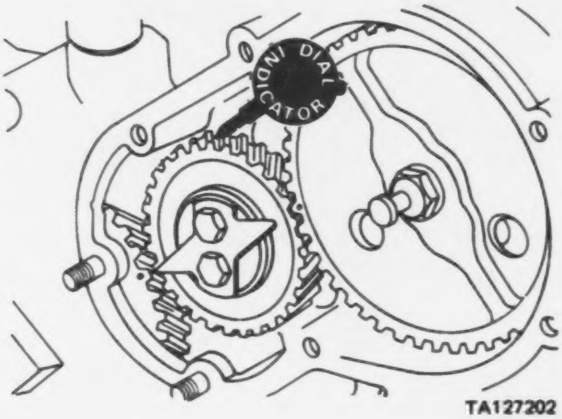
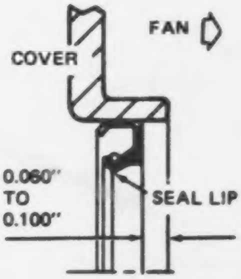
4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
17 (cont)		 TA127200		
		c. Two cap screws (7)	Tighten	Tighten to 35-42 pounds foot torque
		d. Thrust plate (9)	Check	Use feeler gauge to check running clearance between thrust plate (9) and idler gear (11). Clearance must be 0.003 inch. If clearance is not 0.003 inch remove cap screws (7), shim(s) (10), thrust plate (9), and lock plate (8) as an assembly. Remove and measure thickness of shim(s) using micrometer. Add or remove shim(s) as necessary to obtain correct clearance. Install shim(s), thrust plate, lock plate and cap screws as an assembly. Tighten cap screws to 35-42 pounds foot torque
		 TA127201		
		e. Lock plate (8)	Bend	Bend tabs on lock plate to lock cap screws (7)
18	Idler gear (11)	a. Cam gear	Hold	Use screwdriver
		b. Idler gear (11)	Check back-lash	Use dial indicator installed to check back-lash. Backlash shall not exceed 0.006 inch; if backlash exceeds this dimension, replace gear (11)

4-2. ENGINE MAINTENANCE (cont)

h. Timing Gear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
18 (cont)		 TA127202		
19	Crankshaft	a. Oil seal (14)	Install and lubricate	Using depth gage, install oil seal with seal lip inward to depth shown below. After installation apply No. 30 oil to seal.
		 TA127203		
		b. Crankshaft pulley (6)	Lubricate and install	Use No. 30 oil and apply to shaft of crankshaft pulley
		c. Nut (5)	Install	Tighten to 125-135 pounds foot torque
20	Timing gear cover	a. Gasket (4)	Install	
		b. Timing gear cover plate (3)	Install	
		c. Two nuts (2)	Install	
		d. Seven cap screws (1)	Install	Tighten to 25-30 pounds foot torque

4-2. ENGINE MAINTENANCE (cont)

i. Oil Pump.

This task includes repair and replacement of the oil pump consisting of:

- a. Removal
- b. Disassembly
- c. Cleaning
- d. Inspection
- e. Reassembly
- f. Installation

INITIAL SETUP

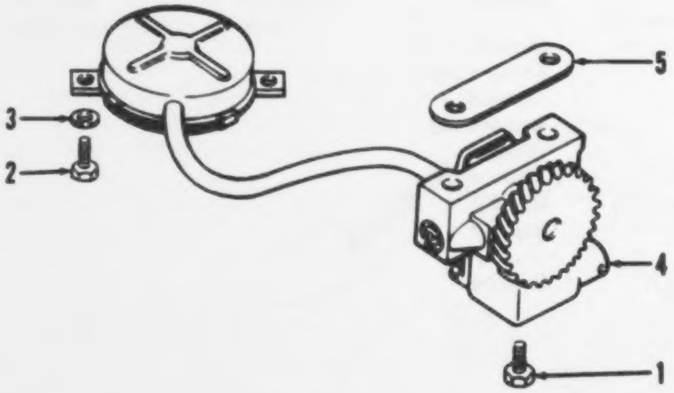
TOOLS	
Dial Indicator	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Thickness Gage	NSN 5210-00-221-1999
Plasti Gage	

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Engine oil (refer to current lubrication order)
Gasket
O-ring

EQUIPMENT CONDITION

Paragraph	Condition Description
3-5k	Oil pan removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Oil Pump screen	Two cap screws (2) and washers (3)	Remove	
2	Oil pump body (4)	Two cap screws (1)	Remove	
3	Cylinder block	a. Oil pump (4) b. Shim(s) (5)	Remove Remove	



KEY

1. Cap screws
2. Cap screws
3. Washers
4. Oil pump
5. Shim(s)

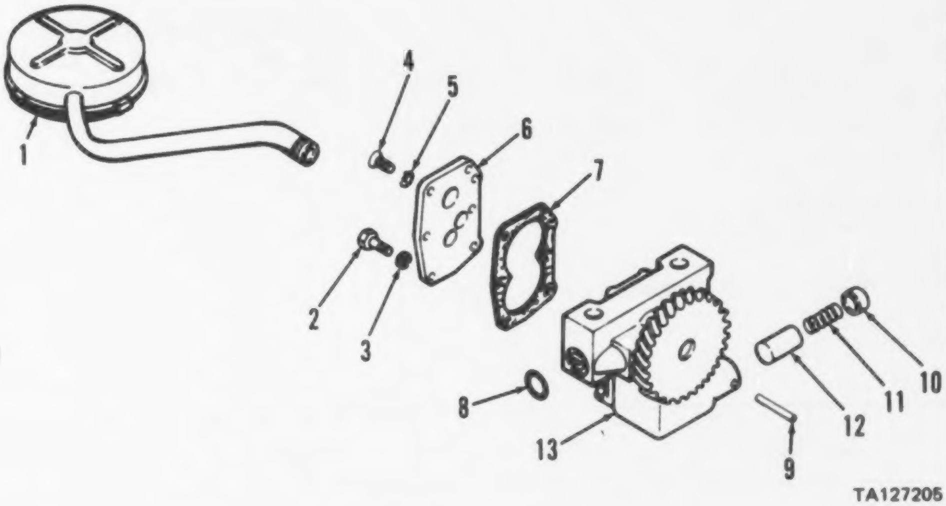
TA127204

4-2. ENGINE MAINTENANCE (cont)

i. Oil Pump (cont).

KEY

1. Oil pump screen
2. Cap screws
3. Lock washers
4. Screw
5. Lock washer
6. Cover assembly
7. Gasket
8. O-ring
9. Cotter pin
10. Spring retainer
11. Relief valve spring
12. Relief valve
13. Oil pump body



STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
4	Oil pump screen (1)	Oil pump screen (1)	Remove	Unscrew from oil pump body
5	Oil pump body (13)	a. Three cap screws (2) and lock washers (3)	Remove	
		b. Screw (4) and lock washer (5)	Remove	
		c. Cover assembly (6)	Remove	
		d. Gasket (7)	Remove and discard	
		e. O-ring (8)	Remove and discard	
		f. Cotter pin (9)	Remove	
		g. Spring retainer (10)	Remove	
		h. Relief valve spring (11)	Remove	
		i. Relief valve (12)	Remove	

4-2. ENGINE MAINTENANCE (cont)

i. Oil Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

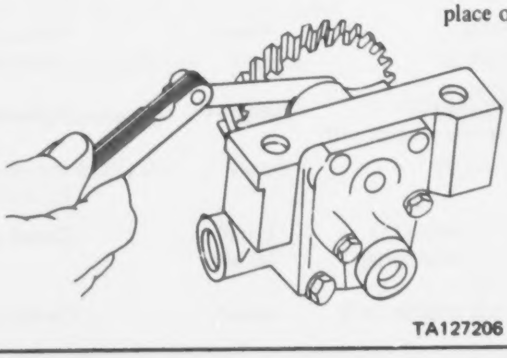
WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
6		Oil pump screen (1)	Clean	Immerse in cleaning solvent P-D-680. Clean all solidified lubricant/sludge from screen and inside suction tube. Dry with moisture free compressed air
7		All other parts	Clean	Use cleaning solvent P-D-680; dry with moisture free compressed air or clean cloths
INSPECTION				
8	Oil pump body (13)	a. Pump drive gear	Check	Use feeler gage as shown and check pump drive gear to oil pump body clearance. Clearance shall not exceed 0.010 inch; if clearance exceeds this dimension, replace oil pump

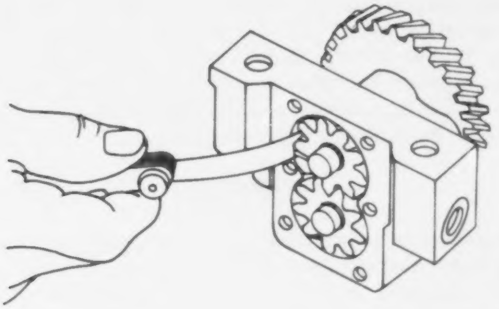


TA127206

4-2. ENGINE MAINTENANCE (cont)

i. Oil Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
8 (cont)		b. Pump gears	Check	Use feeler gage as shown and check pump gears to body radial clearance. Clearance shall not exceed 0.008 inch. Replace oil pump if clearance exceeds this dimension



TA127207

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Pump gears	Check	Place plasti gage on pump gear. Install gasket (7), cover assembly (6), cap screw (2), and lock washer (3) Tighten cap screws to 6-8 pounds foot torque. Remove cover assembly and measure plasti gage to obtain gear to cover clearance. Clearance shall not exceed 0.008 inch. Replace oil pump if clearance is greater than this dimension
9		Relief valve spring (11)	Inspect	Check that free length is 2.125 inches and that load required to compress spring to 1.44 inches is 18-19 pounds. Replace if none of these conditions are met
10		Oil pump screen (1)	Inspect	Replace if screen torn, or if suction tube bent, dented or cracked
11		Relief valve (12) and spring retainer (10)	Inspect	Replace if damaged or distorted
REASSEMBLY				
12	Oil pump body (13)	a. Relief valve (12)	Install	Closed end toward oil pump
		b. Relief valve spring (11)	Install	
		c. Spring retainer (10)	Install	Closed end outward

4-2. ENGINE MAINTENANCE (cont)

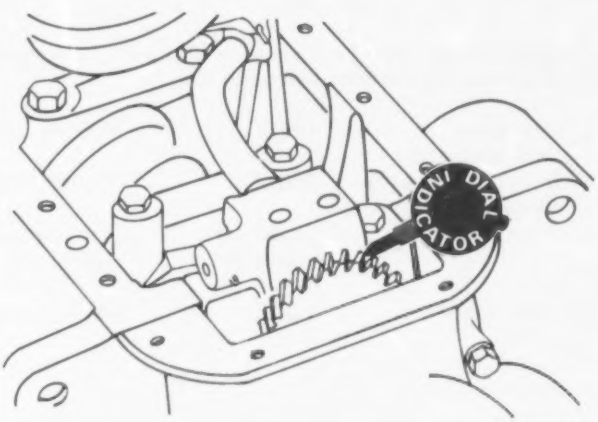
i. Oil Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
12 (cont)		d. Cotter pin (9)	Install	Compress spring (11) and retainer (10) until retainer is below cotter pin hole. Use new cotter pin and bend it to retain in place
		e. Gasket (7)	Position	Use new gasket
		f. Cover assembly (6)	Position	
		NOTE While tightening screw (4) and cap screw (2) position cover assembly to provide free rotation of oil pump gears.		
		g. Screw (4) and lock washer (5)	Install	Tighten to 6-8 pounds foot torque
		h. Three cap screws (2) and lock washers (3)	Install	Tighten to 6-8 pounds foot torque
		i. O-ring (8)	Install and lubricate	Use new O-ring. Use clean engine oil (refer to current lubrication order)
13	Oil pump screen (1)	Oil pump screen (1)	Install	On oil pump body
INSTALLATION				
14	Cylinder block	a. Shim(s) (5)	Position	On top of front main bearing cap
		NOTE Install a shim pack with 0.015 inch minimum thickness to ensure that pump gear and crankshaft gear are not jammed together.		
		CAUTION In following step be careful you don't cut O-ring on sharp edge of cylinder block when you install oil pump		
		b. Oil pump assembly (4)	Position	On top of shim(s) (5) and front main bearing cap
		c. Two cap screws (1)	Install	Tighten to 90-100 pounds foot torque
15	Oil pump screen	Two cap screws (2) and washers (3)	Install	Tighten to 90-100 pounds foot torque

4-2. ENGINE MAINTENANCE (cont)

i. Oil Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
16	Oil pump assembly	Oil pump drive gear	Check backlash	Use dial indicator placed on drive gear as shown. Check backlash between oil pump drive gear and crankshaft gear. Backlash shall be between 0.002 and 0.008 inch. Add shims (5) to increase or remove shims to decrease backlash



TA127208

4-3. FUEL SYSTEM MAINTENANCE

a. Fuel Injector.

This task covers:

a. Testing
b. Disassembly
c. Cleaning and inspection
d. Reconditioning/Overhaul
e. Reassembly
f. Adjusting

INITIAL SETUP

TOOLS	
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Sharpening Stone	NSN 5345-00-198-8050

SPECIAL TOOLS	
Brass Wire Brush	Commercially available
Fuel Injector Test Stand with Compression Gage Adapter	FSCM 10988 P/N M20322
Valve Retractor	FSCM 05083 P/N 66-0148
Cleaning Wires	FSCM 05083 P/N 66-0036
Tip Seat Scraper	FSCM 05083 P/N 66-0149
Sac Hole Drill	FSCM 05083 P/N 66-0151
Carbon Seal Tool	FSCM 10988 P/N A42499
Torque Wrench Adapter	FSCM 05083 P/N 66-0146
Wrench	FSCM 81348 P/N AN9508-6

MATERIALS/PARTS	
Cleaning solvent P-D-680	
Carbon dam seal	
Compression seal	
Lapping compound	(FSCM 05083 P/N 66-0145)
Clean diesel fuel	

EQUIPMENT CONDITION

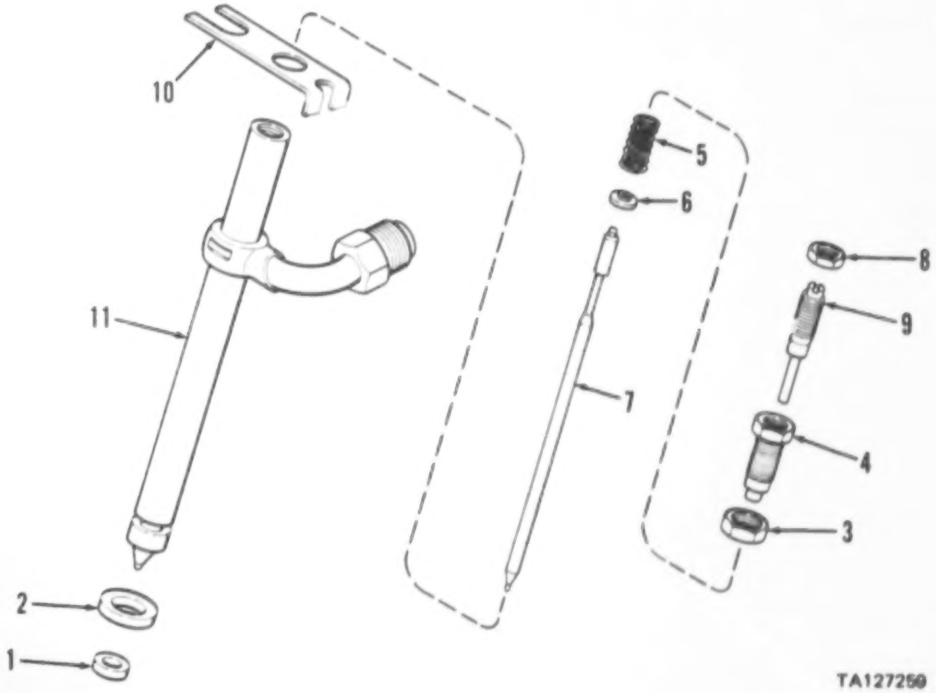
Paragraph	Condition Description
3-6b	Fuel injector removed from engine.

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

KEY

1. Carbon dam seal
2. Compression seal
3. Pressure adjusting screw locknut
4. Pressure adjusting screw
5. Spring
6. Spring seat
7. Valve
8. Lift adjusting screw locknut
9. Lift adjusting screw
10. Locating plate
11. Injector body

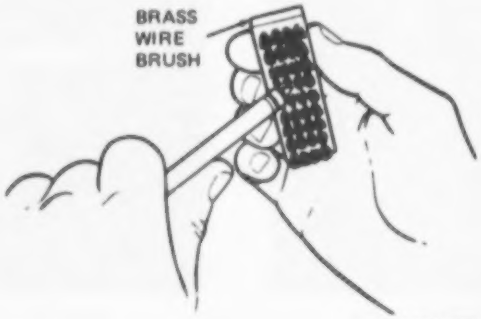


TA127259

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
		NOTE Always test performance of a fuel injector before disassembling. If fuel injector tests are satisfactory, there is no need to disassemble or adjust.		
TESTING				
1		**CAUTION** Don't use motorized equipment or steel wire brushes for cleaning as orifices in body will be destroyed. **NOTE** Don't scrape or brush Teflon coating above carbon steel groove.		
		Fuel injector	Clean	Remove loose carbon from tip, carbon seal groove and body below groove using brass wire brush as shown



STEP	LOCATION	ITEM	ACTION	REMARKS
2		Fuel injector	Install on test stand	Don't attempt to connect fuel injector inlet fitting directly to standard Ermetro or 60 degree swaged type as damage to tubing can result. Use suitable adapter
		WARNING Always direct injector tip away from you. Fuel from spray orifices can penetrate clothing and skin causing serious infection. Always be sure injector tip is enclosed in a receptacle (preferably transparent) to contain spray. If skin is broken by fuel injector spray, get medical attention immediately.		

4-3. FUEL SYSTEM MAINTENANCE (cont)

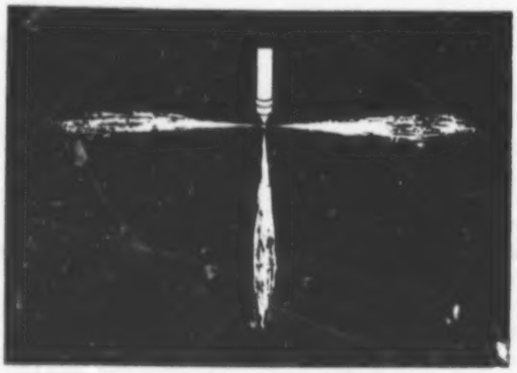
a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
3		Opening pressure check	a. Close pressure gage valve and flush fuel injector by operating test pump rapidly	
		NOTE When testing more than one fuel injector out of engine, there must not be more than 100 PSI difference between any injectors in that engine		
			b. Open gage and raise pressure slowly until injector valve opens. (Gage reading will drop sharply at this point)	Opening pressure for new fuel injectors shall be 3150 to 3250 PSI; for used injectors 2950 to 3050 PSI. Note and record opening pressure If injectors are not within 3150 to 3250 PSI (new injectors) or 2950 to 3050 PSI (used injectors) opening pressure: a. Adjust new fuel injectors (see adjustments) b. Valve lift screw may require adjustment (see adjustments) c. Disassemble and clean used fuel injectors (see disassembly) d. Check for broken or weak opening pressure control spring (see inspection)
4		Seat leakage check	a. Point injector tip down b. Operate test pump rapidly to seat valve firmly	
			c. Raise pressure at fuel injector 200 to 300 PSI under recorded opening pressure	A drop should not form on injector tip within 10 seconds. Slight dampness is permissible with a used injector. If drops form on injector tip: a. Disassemble and clean fuel injector (see disassembly)

4-3. FUEL SYSTEM MAINTENANCE (cont)

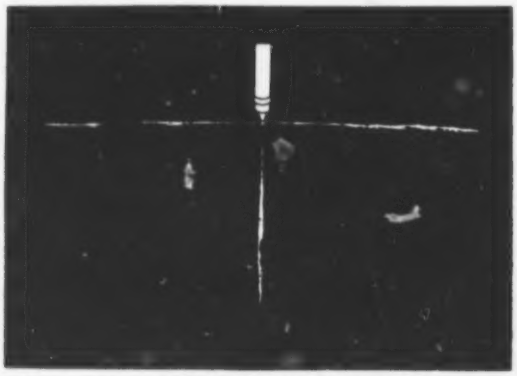
a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
4 (cont)				b. Valve is not free in guide; lap valve to tip seat (see reconditioning) c. Inspect for pitted or cracked valve tip, eroded valve seat or pitted and distorted body. These conditions require replacement of complete fuel injector
5		Spray pattern check	a. Close pressure gage	
			b. Operate tester at 60 strokes per minute and observe spray pattern	Fuel shall be finely atomized and not a solid irregular spray pattern



FINE ATOMIZED SPRAY PATTERN

TA127256



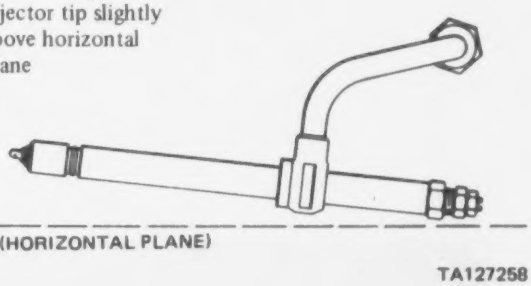
SOLID IRREGULAR SPRAY PATTERN

TA127257

				Injector will chatter when tester is operated rapidly. Chatter is an indication of valve freedom and will improve atomization. Chatter also indicates good seat width and interference angle conditions
				If fuel injector produces a solid irregular spray pattern: a. Check for clogged, eroded, or chipped orifices b. Disassemble and clean fuel injector (see disassembly) c. Lap valve to guide area (see reconditioning)

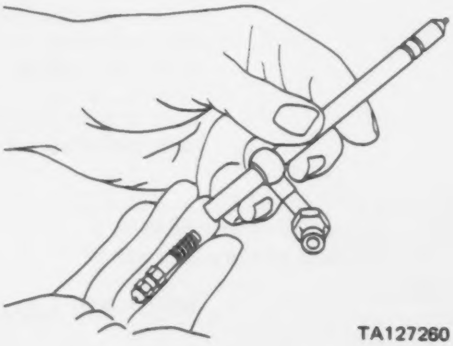
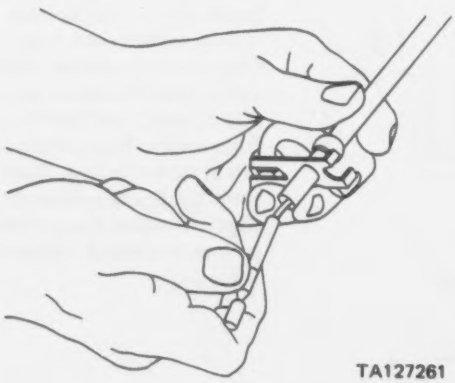
4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
5 (cont)				d. Check for pitted or eroded valve or seat, valve interference angle worn, bent valve and distorted body. These conditions require replacement of complete fuel injector
6		Injector leak-off check	a. Loosen connector nuts and reposition injector tip slightly above horizontal plane 	
			b. Tighten connector nuts and raise pressure to 1500 PSI	
			c. Observe leakage from return end of fuel injector	After one drop falls, leak-off must be 3 to 10 drops in 30 seconds with No. 2 diesel fuel at room temperature (65 to 75 degrees) If proper leak-off is not obtained: a. If leak-off is excessive, replace fuel injector b. If leak-off is low, disassemble and clean fuel injector (see disassembly) c. Lap valve to guide area to increase leak-off (see reconditioning)
DISASSEMBLY				
		NOTE Fuel injector contains precision ground and lap fitted parts; exercise care in keeping your work area and tools clean. Handle parts carefully to avoid damaging them.		
7		Carbon dam seal (1)	Remove	Use long nose pliers

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
8		Compression seal (2)	Remove	Use long nose pliers
9		Pressure adjusting screw locknut (3)	Loosen	If a holding tool is available, place fuel injector in holding tool and secure tool in vise; then loosen locknut
10		Pressure adjusting screw (4)	Remove	Hold injector body in one hand, invert it and back out pressure adjusting screw, allowing spring (5) and spring seat (6) to fall into your other hand as shown
11		Spring (5)	Remove	 TA127260
12		Spring seat (6)	Remove	
13		Valve (7)  TA127261	Remove	Valve may slide out of body at this time and must be handled carefully by its stem. If valve does not slide freely from body, use valve retractor P/N 66-0148 to remove. To prevent bending the valve, bottom it in body with retractor. Push down on retractor body to mount collet. Turn knurled nut counterclockwise to secure collet and withdraw valve as shown
14		Lift adjusting screw locknut (8)	Remove	

4-3. FUEL SYSTEM MAINTENANCE (cont)

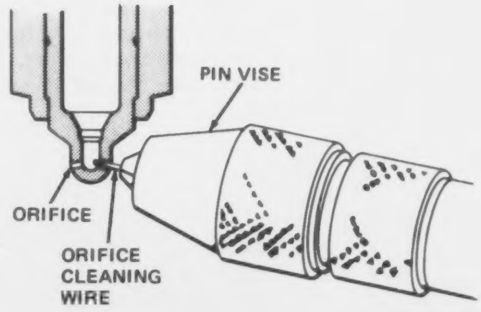
a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
15		Lift adjusting screw (9)	Remove	
CLEANING AND INSPECTION				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and golves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

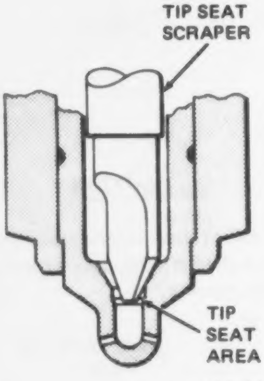
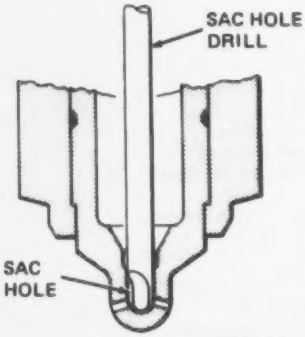
STEP	LOCATION	ITEM	ACTION	REMARKS
16		All parts	Place in solvent	Use cleaning solvent P-D-680
17		Injector body (11)	Clean	Use brass wire brush to clean tip of body and exterior of body
18		Injector body (11) spray orifices	Clean	Use cleaning wires P/N 66-0036 in 0.011 inch diameter. Secure wire in pin vise with end of wire protruding 1/32 inch. A longer length of wire will bottom on opposite wall or sac hole and tends to easily break. Use a stone to remove cutting burrs from end of wire. If a small flat is stoned on one side of wire, it will facilitate cutting carbon from orifice. Insert cleaning wire and rotate it until it is free. Flush body and inspect tip. If any orifices are chipped at edges or eroded to an extent that spray pattern is affected, replace fuel injector



TA127262

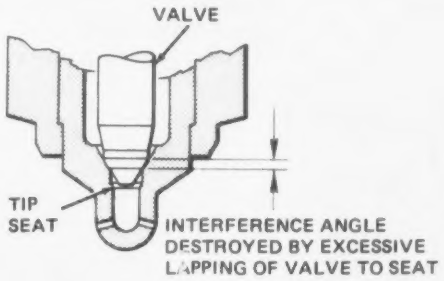
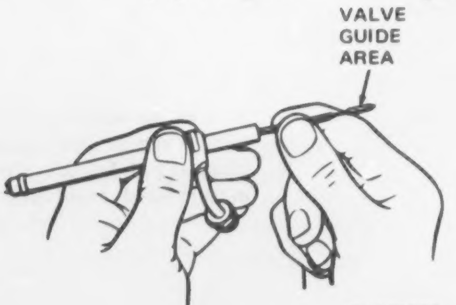
4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING AND INSPECTION (cont)				
19		Injector body (11) seat area	Clean  TA127263	Use tip seat scraper P/N 66-0149 as shown
20		Injector body (11) sac hole	Clean  TA127264	Use sac hole drill P/N 66-0151 and rotate it to clean deposits from sac hole. Repeat orifice cleaning (step 18 above)
21		Valve (7)	Clean	Use brush to remove deposits from seat areas, remove varnish with a solvent and felt cleaning pad. Inspect valve for pitting or erosion which could cause leakage

4-3. FUEL SYSTEM MAINTENANCE (cont)

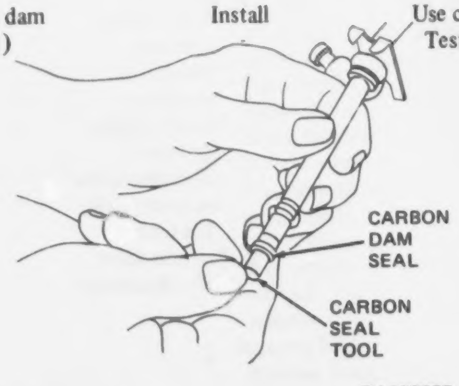
a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING AND INSPECTION (cont)				
22		Adjusting screw (4, 9)	Inspect	Replace if worn, or if threads damaged
23		Spring (5)	Inspect	Check that free length of spring is 0.563 inch and compressed length is 0.456 to 0.478 inch at 29 pounds
RECONDITIONING/OVERHAUL				
24		**CAUTION** Excessive lapping will destroy interference angle between seat and valve causing loss of chatter with poor atomization resulting in replacement of fuel injector.		
		Injector body (11) tip seat  VALVE TIP SEAT INTERFERENCE ANGLE DESTROYED BY EXCESSIVE LAPPING OF VALVE TO SEAT TA127265	Lap valve and tip seat	Use lapping compound FSCM 05083 P/N 66-0145. Place small amount of lapping compound on valve seat and insert valve in injector body. Grip top of valve with valve retractor P/N 66-0148 and rotate valve by hand, first clockwise then counterclockwise for a total of 3 to 5 revolutions. Flush injector body thoroughly; wash valve and reassemble injector and retest. If valve and seat are worn, seat may be tight, but chatter may have been lost in the lapping process. In such an instance replace fuel injector
25		Injector body (11) valve guide  TA127266	Lap valve guide	Use lapping compound FSCM 05083 P/N 66-0145. Place small amount on guide area of valve. Bottom valve in body and grasp with valve retractor P/N 66-0148. Rotate valve 10 revolutions while raising and lowering it very slightly. Flush and wash compound from both parts, assemble fuel injector and recheck fuel leak-off. If leak-off is still low, lap guide until correct leak-off is obtained. Flush fuel injector thoroughly after lapping

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
26		All parts	Wash and flush	Wet all parts and hands with clean diesel fuel during assembly
27		Valve (7)	Install	Handle valve by its shank and slide it partially into body (11)
28		Locating plate (10)	Install	
29		Lift adjusting screw (9)	Install in pressure adjusting screw (4)	
30		Pressure adjusting screw locknut (3)	Install	On screw (4)
31		Lift adjusting screw locknut (8)	Install	On screw (9)
32		Spring (5) and spring seat (6)	Install	Install on lift and pressure adjusting screw assembly. Tilt injector body and with spring seat contacting valve top, push valve and spring components into body. Exercise care not to dislodge spring seat during reassembly. Thread pressure adjusting screw into body by hand until spring is compressed enough to hold all parts in place
33		Compression seal (2)	Install	
34		Carbon dam seal (1)	Install	Use carbon seal tool P/N A42499 as shown. Test and adjust fuel injector



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4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENTS				
35		Opening pressure adjustment	a. Loosen pressure adjusting screw locknut (3)	
			b. Loosen lift adjusting screw locknut (8)	Hold pressure adjusting screw locknut (3) while loosening
			c. Install fuel injector with tip downward in test stand	
			d. Back out lift adjusting screw (9) one full turn	
			e. Pump fuel through fuel injector and note opening pressure	Opening pressure shall be 3150 to 3250 PSI for new fuel injectors or 2950 to 3050 PSI for used fuel injectors
			f. Turn pressure adjusting screw (4) while holding lift adjusting screw (9) until correct opening pressure is obtained. Don't tighten pressure adjusting screw locknut (3) at this time	Turn clockwise to increase opening pressure or counterclockwise to decrease opening pressure (gage reading will drop sharply at point that fuel injector valve opens)
			g. Perform valve lift adjustment	

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENTS (cont)				
		CAUTION In following step, don't manually bottom valve using excessive force as bending of valve can result requiring fuel injector replacement.		
36		Valve lift adjustment	a. Pump fuel through fuel injector, hold pressure adjusting screw and slowly turn lift adjusting screw clockwise until valve ceases to open	
			b. Raise pressure 200 to 500 PSI over fuel injector opening pressure	Opening pressure for new fuel injectors is 3150 to 3250 PSI; for used fuel injectors 2950 to 3050 PSI. Some fuel may collect on injector tip; however a rapid dribble must not be apparent
			c. To set lift, turn lift adjusting screw (9) counterclockwise 1/2 turn	Turning screw (9) 1/2 turn sets valve lift 0.009 inch off valve seat
			d. Hold lift adjusting screw and tighten lift adjusting screw locknut	Use tool P/N AN9508-6; tighten to 40-45 pounds-inch torque
			e. Recheck opening pressure adjustment and readjust if necessary	
			f. Test fuel injector	
			g. Remove fuel injector from test stand	

4-3. FUEL SYSTEM MAINTENANCE (cont)

a. Fuel Injector (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENTS (cont)				
36 (cont)		**NOTE** In following step, don't allow pressure adjusting screw to turn while tightening pressure adjusting screw locknut.		
			h. Tighten pressure adjusting screw locknut (3)	Use torque wrench adapter P/N 66-0146; tighten to 70-75 pounds-inch torque
			i. Recheck opening pressure	

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump.

This task covers repair of the fuel injection pump consisting of:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly
e. Testing

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641
Micrometer, zero to 2 inches	

SPECIAL TOOLS

Holding Fixture	FSCM 84760 P/N 20029
Holding Fixture	FSCM 84760 P/N 19965
Fixture	FSCM 84760 P/N 19969
Extractor	FSCM 84760 P/N 13383
Extractor	FSCM 84760 P/N 13301
Bristol Socket Cam	
Advance Screw Wrench	FSCM 84760 P/N 15499
Cam Advance Screw Bushing	FSCM 84760 P/N 15500
Advance Plug Tool	FSCM 84760 P/N 14490
Piston Ring Compressor	FSCM 84760 P/N 16199
Advance Window	FSCM 84760 P/N 19918
Adapter	FSCM 84760 P/N 21900
Snap Ring Pliers	FSCM 84760 P/N 13337
Leaf Spring Adjusting Screwdriver	FSCM 84760 P/N 13336
Shutoff Cam Removal Tool	FSCM 84760 P/N 13339
Holding Fixture Bracket Kit	FSCM 84760 P/N 19930
Socket Setscrew Wrench	FSCM 84760 P/N 13316
Vent Wire Extractor	FSCM 84760 P/N 18264
Rotor Retaining Ring Installation Tool	FSCM 84760 P/N 13375
Linkage Hook Adjustment Gauge	FSCM 84760 P/N 18914
Linkage Hook Wrench	FSCM 84760 P/N 13379

MATERIALS/PARTS

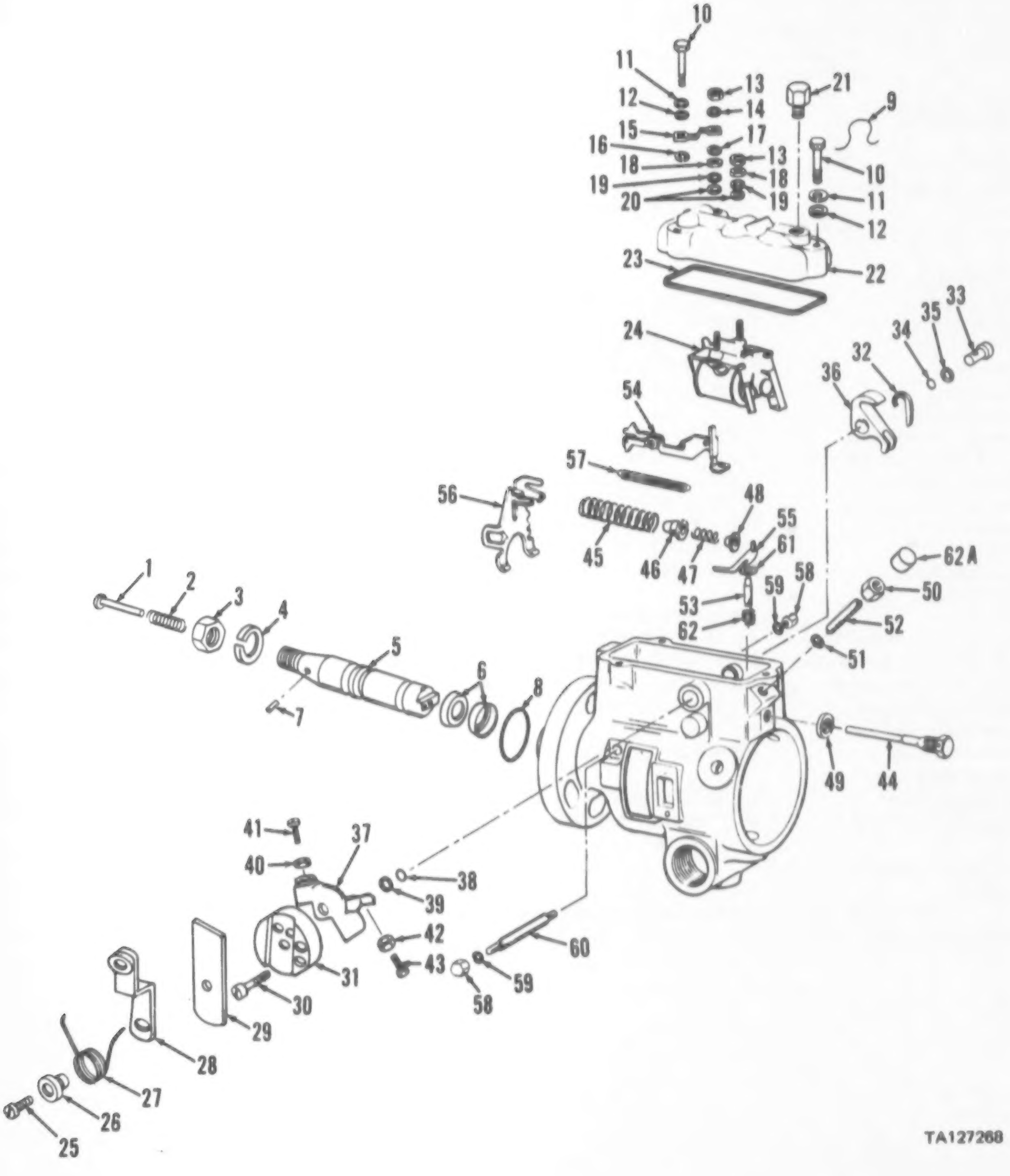
Gasket Kit
Governor control cover and solenoid frame assembly service assembly
Cleaning solvent P-D-680

EQUIPMENT CONDITION

Paragraph	Condition Description
3-6c	Fuel injection pump removed from engine.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).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4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump.

KEY

1. Thrust plunger
2. Spring
3. Nut
4. Lock washer
5. Drive shaft
6. Seals
7. Roll pin
8. Pilot tube seal
9. Safety wire
10. Screws
11. Lock washers
12. Washers
13. Nuts
14. Washer
15. Grounding strap
16. Lock washer
17. Lock washer
18. Nuts
19. Washers
20. Insulating washers
21. Connector
22. Governor control cover
23. Gasket
24. Solenoid frame and arm assembly
25. Screw
26. Spring retainer
27. Throttle lever spring
28. Throttle lever assembly
29. Spacer adjusting arm
30. Screw
31. Spacer
32. Shaft retainer clip
33. Shut-off shaft
34. Seal
35. Washer
36. Throttle shaft lever
37. Throttle shaft assembly
38. Seal
39. Washer
40. Nut
41. Low idle adjusting screw
42. Nut
43. High idle adjusting screw
44. Guide stud
45. Governor spring
46. Spring retainer
47. Idling spring
48. Idling spring guide
49. Washer
50. Nut
51. Seal
52. Torque screw
53. Metering valve
54. Linkage hook
55. Metering valve arm
56. Governor arm
57. Linkage spring
58. Pivot shaft nuts
59. Seals
60. Governor arm pivot shaft
61. Shim
62. Spring

62A. Cap

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				

NOTE

Before starting disassembly of fuel injection pump, cover inlet and outlet ports, wash pump with clean diesel fuel to remove all external grease and dirt, and dry with filtered, compressed air. Work space, tools, and hands must be clean during following task.

Use a clean pan to place parts into during disassembly; a pan of clean diesel fuel or calibrating oil must be available in which parts may be flushed. These should be deep pans with rounded corners to lessen chances of dirt pockets.

STEP	LOCATION	ITEM	ACTION	REMARKS
1	Front of pump	a. Thrust plunger (1) and spring (2)	Pull and remove	
		b. Nut (3) and lock washer (4)	Remove	
		c. Drive shaft (5)	Remove	
		d. Two seals (6)	Remove and discard	

NOTE

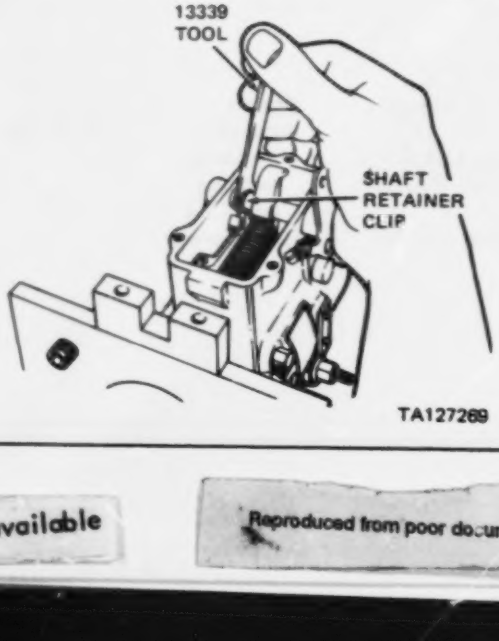
Don't remove roll pin (7) unless damaged.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Roll pin (7)	Remove only if sheared or damaged	Use 5/64 inch easy out extractor or 3/32 inch carbide tipped drill
		f. Pilot tube seal (8)	Remove	Use screwdriver and pry out
2		Fuel injector pump	Mount	In holding fixture P/N 20029
3	Housing	a. Safety wire (9)	Cut, remove and discard	
		b. Three screws (10), lock washers (11) and washers (12)	Remove	
		c. Governor control cover (22) and solenoid frame and arm assembly (24)	Remove	
		d. Gasket (23)	Remove and discard	

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
4	Governor control cover (22)	a. Two nuts (13)	Remove	
		b. Washer (14), grounding strap (15), and lock washers (16 and 17)	Remove	
		c. Two nuts (18), washers (19), and insulating washers (20)	Remove	Support solenoid frame and arm assembly (24)
		d. Solenoid frame and arm assembly (24)	Remove	
		e. Connector (21)	Remove	
5	Housing, top	a. Screw (25) and spring retainer (26)	Remove	
		b. Throttle lever spring (27)	Disengage and remove	
		c. Throttle lever assembly (28)	Remove	
		d. Spacer adjusting arm (29)	Remove	
		e. Screw (30)	Remove	
		f. Spacer (31)	Remove	
		g. Shaft retainer clip (32)	Remove	Rotate shut-off shaft to full shut-off position (clip horizontal). Use tool P/N 13339 placed between housing and governor linkage hook as shown, pry gently sliding clip out of its groove and off throttle shaft



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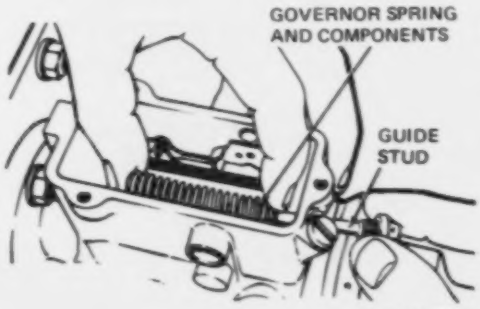
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
5 (cont)		h. Shut-off shaft (33)	Withdraw and remove	
		i. Seal (34) and washer (35)	Remove	
		j. Throttle shaft lever (36)	Remove	Slide off throttle shaft assembly (37)
		k. Throttle shaft assembly (37)	Withdraw and remove	
		l. Seal (38) and washer (39)	Remove	
		m. Nut (40)	Loosen	
		n. Low idle adjusting screw (41)	Remove	
		o. Nut (42)	Loosen	
		p. High idle adjusting screw (43)	Remove	
		q. Guide stud (44)	Loosen	
		r. Governor spring (45)	Grasp securely	
		s. Guide stud (44)	Remove	While grasping governor spring (45) securely
		t. Governor spring (45), spring retainer (46), idling spring (47), and idling spring guide (48)	Remove	
		u. Washer (49)	Remove	
		v. Cap (62A), nut (50) and seal (51)	Remove	
		w. Torque screw (52)	Remove	



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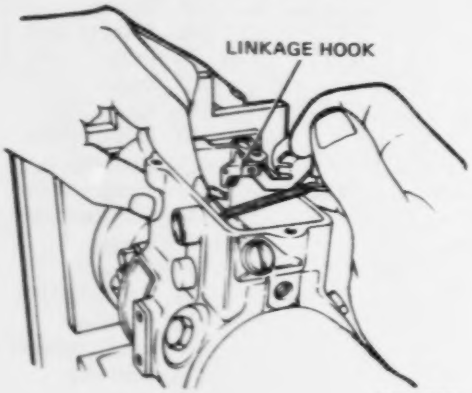
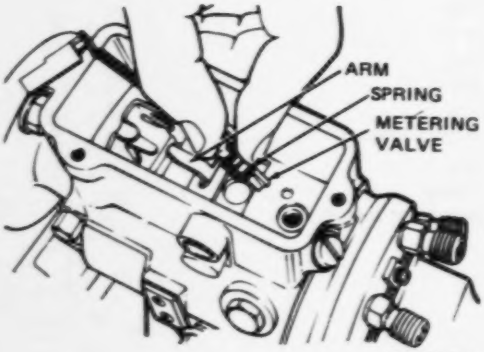
		x. Metering valve (53)	Depress	
		y. Governor linkage hook assembly (54)	Raise while depressing metering valve (53)	Raise from metering valve arm (55) pin
		z. Governor arm (56)	Hold forward	

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
5 (cont)		aa. Linkage hook (54)	Disengage from governor arm (56) and place over side of housing	Don't disengage linkage spring (57)
		 TA127271		
		ab. Two pivot nuts (58) and seals (59)	Remove	
		ac. Governor arm pivot shaft (60)	Withdraw and remove	
		ad. Governor arm (56), linkage hook (54) and linkage spring (57)	Remove	
		ae. Metering valve (53), metering valve arm (55), shim (61) and spring (62)	Remove	
		 TA127272		

4-3. FUEL SYSTEM MAINTENANCE (cont)

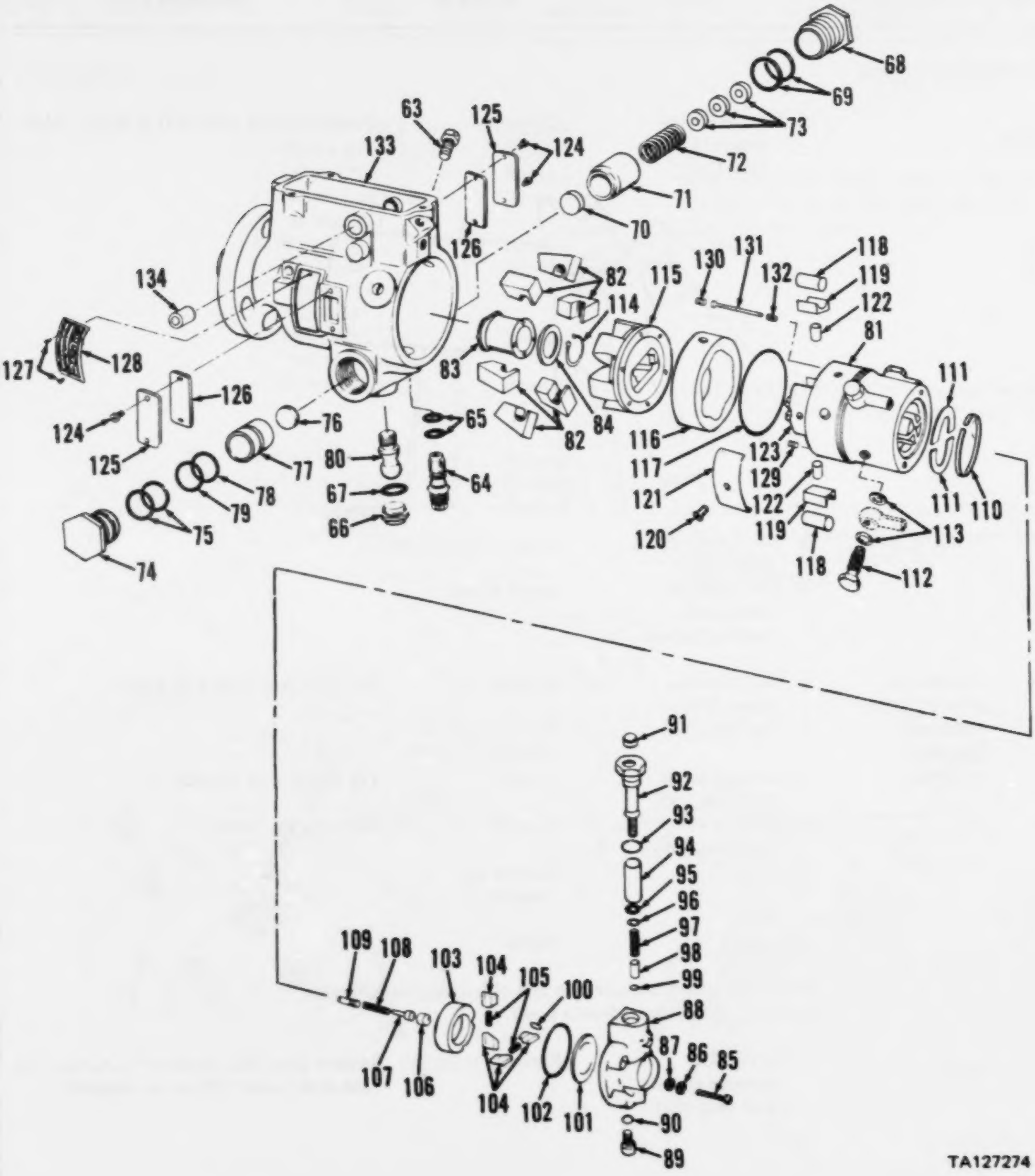
b. Fuel Injection Pump (cont).

KEY

63. Head locking screws
64. Head locating screw
65. Seals
66. Advance screw hole plug
67. Seal
68. Advance piston hole plug
69. Seals
70. Slide washer
71. Piston
72. Advance adjusting spring
73. Shim
74. Power piston hole plug
75. Seals
76. Slide washer
77. Power piston
78. Seal
79. Piston ring
80. Cam advance screw
81. Hydraulic head
82. Governor weights
83. Thrust sleeve
84. Thrust washer
85. Screws
86. Lock washers
87. Washers
88. End plate
89. Plug
90. Seal
91. Plug
92. Sleeve
93. Seal
94. Filter element
95. Seal
96. O-ring
97. Regulator spring
98. Regulating piston
99. Seal
100. Rollpin
101. Thrust plate
102. Seal
103. Liner
104. Pump blades
105. Springs
106. Delivery valve screw
107. Stop
108. Spring
109. Delivery valve
110. Snap ring
111. Rotor retainers
112. Fuel line connector screws
113. Washers
114. Retaining ring
115. Governor weight retainer
116. Cam ring
117. Seal
118. Cam rollers
119. Cam roller shoes
120. Adjusting screw
121. Leaf spring
122. Pumping plungers
123. Rotor
124. Screws
125. Timing line covers
126. Gaskets
127. Screws
128. Nameplate
129. Plug screw
130. Plug screws
131. Vent wire retainer
132. Vent wire
133. Housing
134. Bushings

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).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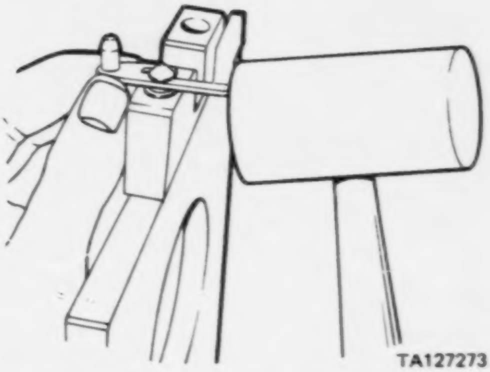
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
5 (cont)		af. Metering valve arm (55) and shim (61)	Remove	From metering valve (53) as shown below



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STEP	LOCATION	ITEM	ACTION	REMARKS
6	Housing, sides	a. Two head locking screws (63)	Loosen; remove one	
		b. Fuel injection pump and holding fixture	Invert in vise	
7	Automatic advance group (sides and bottom of housing)	a. Head locating screw (64)	Remove	Use 7/16 inch deep well socket
		b. Two seals (65)	Remove and discard	
		c. Advance screw hole plug (66)	Loosen	Tap gently with hammer
		d. Advance screw hole plug (66)	Remove	Use tool P/N 14490
		e. Seal (67)	Remove and discard	

NOTE

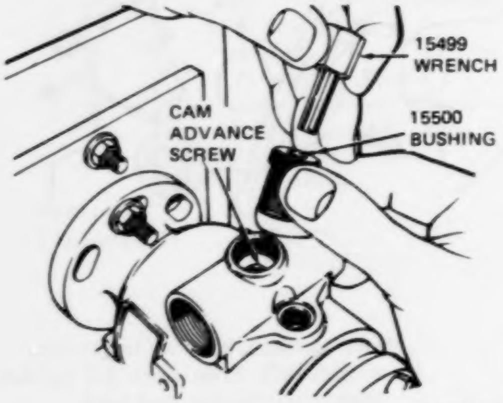
Power side piston is located on side of housing marked with letters CC (just above advance boss).

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Spring side advance piston hole plug (68)	Remove	Remove plug (68), piston (71), spring (72), and slide washer (70) as an assembly.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
7 (cont)		g. Two seals (69)	Remove	
		h. Slide washer (70)	Remove	
		i. Piston (71)	Remove	Invert spring side piston hole plug and let piston (71), spring (72), and shim (73) fall into your hand
		j. Advance adjusting spring (72)	Remove	
		k. Shim (73)	Remove	
		l. Power side piston hole plug (74)	Remove	
		m. Two seals (75) and slide washer (76)	Remove	
		n. Power piston (77)	Remove	Hold plug (74) in one hand and rap sharply into palm of your other hand. Piston (77) will slide out
		o. Seal (78)	Remove	
		p. Piston ring (79)	Remove	
		q. Cam advance screw (80)	Remove	Assemble tools P/N 15499 and P/N 15500 into advance screw plug hole to remove (see below). Use 5/8 inch socket on P/N 15499 tool



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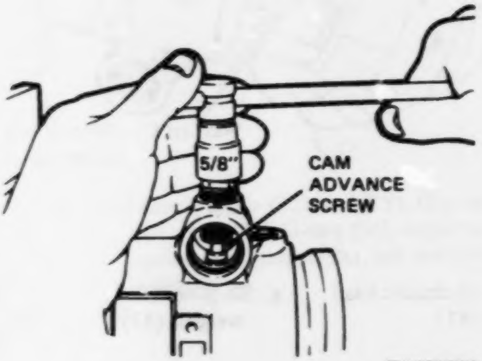

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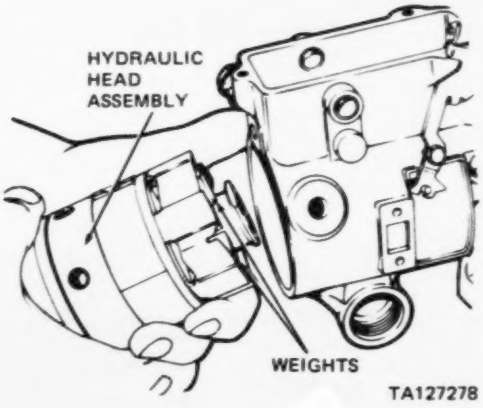
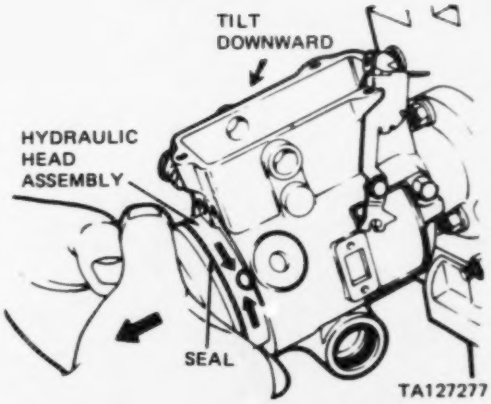
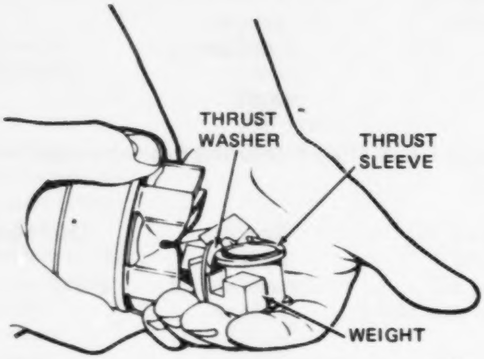
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
8		Fuel injector pump and holding fixture	Position in vise with rear of pump tilted slightly downward	
9	Housing	a. Head locking screw (63)	Remove	
		CAUTION Be careful when performing following step not to drop governor weights.		
		b. Hydraulic head (81)	Remove	Grasp with both hands and withdraw using a slight rotary motion
		 HYDRAULIC HEAD ASSEMBLY WEIGHTS TA127278	 TILT DOWNWARD HYDRAULIC HEAD ASSEMBLY SEAL TA127277	
10	Hydraulic head (81)	a. Six governor weights (82)	Remove	Invert hydraulic head and let governor weights (82), thrust sleeve (83) and thrust washer (84) fall into your hand

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
10 (cont)		b. Thrust sleeve (83)	Remove	
		c. Thrust washer (84)	Remove	
		 TA127279		
		d. Hydraulic head (81)	Position on holding fixture P/N 19930 so that governor weight engages bar on fixture	
		e. Four screws (85), lock washers (86), and washers (87)	Remove	
		f. End plate (88)	Remove	
		g. Plug (89)	Remove	
		h. Seal (90)	Remove and discard	
11	End plate (88)	a. Plug (91)	Remove	
		b. Sleeve (92)	Remove	Remove sleeve (92), seal (93), filter element (94), seal (95), O-ring (96), regulator spring (97), piston (98), and seal (99) as an assembly
		c. Seal (93)	Remove and discard	
		d. Filter element (94)	Remove	
		e. Seal (95)	Remove and discard	
		f. O-ring (96)	Remove and discard	

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
11 (cont)		g. Regulator spring (97)	Remove	
		h. Regulating piston (98)	Remove	
		i. Seal (99)	Remove and discard	
		NOTE Don't remove rollpin (100) in following step unless replacement is required.		
		j. Rollpin (100)	Remove	Use long nosed pliers or proper size drill
		k. Seal (102)	Remove and discard	
		l. Thrust plate (101)	Remove	
12	Hydraulic head (81)	a. Liner (103), four transfer pump blades (104), and two springs (105)	Lift out and remove	
		b. Delivery valve screw (106)	Remove	Use socket setscrew wrench tool P/N 13316
		c. Stop (107), spring (108), and delivery valve (109)	Remove	Lift hydraulic head and shake parts into your hand; if necessary use tool P/N 13383 to remove delivery valve
		NOTE If delivery valve (109) sticks in its bore in following step, use tool P/N 13383 to remove.		
		d. Rotor retainer snap ring (110)	Remove	Use small blade screwdriver or dull scribe
		e. Two rotor retainers (111)	Remove	Move outward as far as possible to clear rotor and lift hydraulic head until rotor is flush with inner face of hydraulic head; then, remove rotor retainers

4-3. FUEL SYSTEM MAINTENANCE (cont)

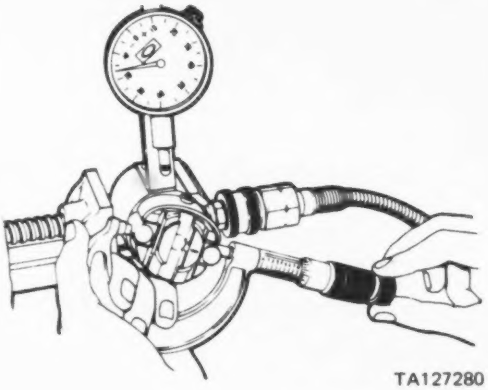
b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
12 (cont)		**CAUTION** **Rotor is no longer retained in hydraulic head. Don't let them slip apart when performing the following step.**		
		f. Hydraulic head (81)	Place in holding fixture P/N 19965	
		g. Four fuel line connector screws (112) and eight washers (113)	Remove	
		h. Retaining ring (114)	Remove	Use snap ring pliers tool P/N 13337
		i. Governor weight retainer (115)	Lift off and remove	
		j. Cam ring (116)	Lift off and remove	
		k. Seal (117)	Remove and discard	
		l. Cam rollers (118)	Check and record roller-to-roller dimension: a. Install fixture P/N 19969 in vise b. Assemble 1/4-18 NPT fitting to fixture air inlet c. Adapt fitting to a 30–100 PSI source of clean, dry air	
		CAUTION **Handle hydraulic head carefully in following step and hold cam rollers (118) and shoes (119) in their slots to prevent rotor, cam rollers, and shoes from falling.**		

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
12 (cont)				d. Install hydraulic head (81) in fixture on air inlet side of fixture e. Rotate rotor until cam rollers (118) are pushed to their extreme outward position by air pressure f. Use a two inch micrometer and measure cam roller-to-cam roller dimension as shown g. Dimension shall be 1.965 ± .0015 inch. Record the dimension obtained h. Remove hydraulic head from fixture and install in fixture P/N 19965



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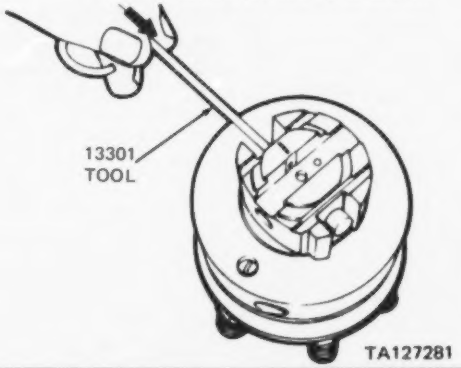
STEP	LOCATION	ITEM	ACTION	REMARKS
		m. Adjusting screw (120)	Remove	Use tool P/N 13336
		n. Leaf spring (121)	Remove	

NOTE

Handle following parts (118, 119, 122, and 123) carefully; hands must be clean and wet with clean diesel fuel.

STEP	LOCATION	ITEM	ACTION	REMARKS
		o. Two cam rollers (118)	Remove	
		p. Two cam roller shoes (119)	Remove	
		q. Two pumping plungers (122)	Remove	Use extractor P/N 13301 as shown



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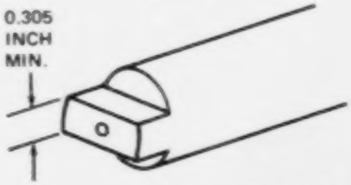
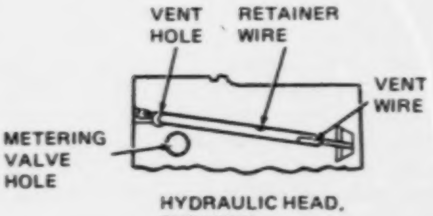
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
12 (cont)		**CAUTION** In following step, don't handle rotor shank.		
		r. Rotor (123)	Remove	
13	Housing (133)	a. Four screws (124)	Remove	
		b. Two timing line covers (125)	Remove	
		c. Two timing line cover gaskets (126)	Remove and discard	
		d. Two screws (127)	Remove	If necessary
		e. Nameplate (128)	Remove	If necessary
14	Hydraulic head (81)			
		NOTE Don't perform following steps unless vent wire and retainer are damaged.		
		a. Plug screw (129)	Remove	If damaged
		b. Two plug screws (130)	Remove	If damaged
		c. Vent wire retainer (131)	Remove	If damaged. Grasp hydraulic head in your hand and shake vent retainer into other hand
		d. Vent wire (132)	Remove	Use tool P/N 18264
15	Housing (133)	Two bushings (134)	Remove only if damaged	Use proper size sleeve
CLEANING				
		WARNING Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.		
16		All parts	Clean	Use cleaning solvent P-D-680

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	EXAMINE FOR EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION											
17	Housing	a. Housing (133)	X	X	X	X		X	X	X	Seal seats, bores and threads
		b. Drive shaft (5)	X	X	X	X		X	X	X	Measure distance across flats of drive tang (see below); distance must not be less than 0.305 inch. Shaft diameter in drive shaft seal area must be free of nicks and scratches. Moderate shaft wear from the seal lips is normal 
18	Hydraulic head (81)	a. Hydraulic head (81)	X	X	X	X	X	X	X	X	Central and metering valve bores and ports
		b. Vent wire (132) and retainer (131)		X			X				Check vent wire for freedom of movement. If wire is free, flush head and blow out all passages with clean, dry air (see below). If wire is stuck in screw remove and replace after a thorough cleaning of the unit and hydraulic head passage 

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HYDRAULIC HEAD,
TOP VIEW

TA127283

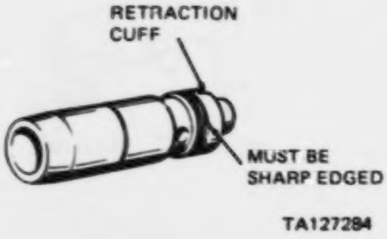
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	EXAMINE FOR: EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
18 (cont)		c. Rotor	X	X	X	X	X				Check radii contacted by leaf spring and tang slot for excessive wear. Check all slots, charging and discharge ports for chipping of edges or dirt and the rotor shank for scratches. If damage or excessive wear is apparent replace head and rotor as a (matched) unit
		d. Delivery valve (109) and spring (108)	X	X	X	X	X		X		Check retraction cuff for chipping or erosion of edges (see below)

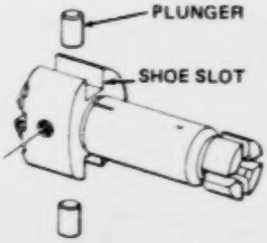
CAUTION

Don't force plungers into the bores and don't handle rotor shank.



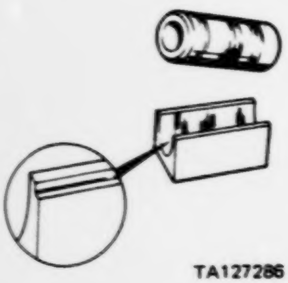
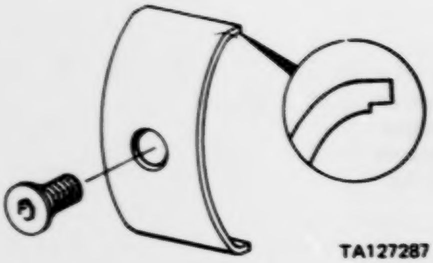
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

			EXAMINE FOR								
STEP	LOCATION	ITEM	EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
18 (cont)		**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.									
		e. Pumping plungers (122)	X	X	X	X	X				Hold rotor under clean oil and insert plungers into their bore. With your thumb and forefinger over shoe slots, tilt from side to side several times to determine complete freedom of movement. Reversing or interchanging initial positions may be necessary as these are matched parts. If plungers are sticking, but not visibly damaged, clean both plungers and bore with a soft brush and cleaning solvent P-D-680
		 TA127285									

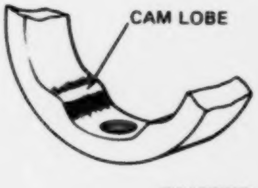
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

			EXAMINE FOR								
STEP	LOCATION	ITEM	EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
18 (cont)		f. Cam rollers and shoes (118 and 119)	X	X	X			X	X		Check each roller in its shoe for freedom of rotation. Inspect top edge of each shoe, where retained by leaf spring, for chipping or excessive wear. Inspect for abrasive wear patterns as shown  TA127286
		g. Leaf spring and screws (120 and 121)	X	X	X			X	X	X	Check for excessive wear at points where spring contacts the radii on rotor and along steps that retain roller shoes (see illustration). Check adjusting screw for tightness in rotor  TA127287

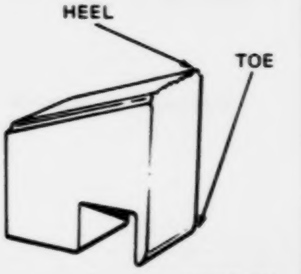
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

			EXAMINE FOR								
STEP	LOCATION	ITEM	EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
18 (cont)		h. Cam ring (116)	X	X	X	X			X	X	Tool marks between lobes should not be considered damage. Mottled appearance of cam is from heat treatment, not from operation. Inspect cam lobes and edges of all flat surfaces. If evidence of spalling or flaking out, replace (see below)  TA127288
		i. Governor weight retainer (115)	X	X	X				X	X	Weight pivot area and ring area for wear

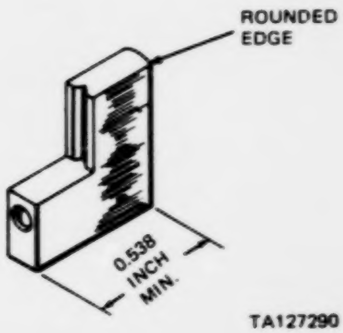
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

			EXAMINE FOR								
STEP	LOCATION	ITEM	EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
18 (cont)		j. Governor weights (82)	X	X	X		X		X		Check pivot points (heel and toe) for excessive wear (see below)  TA127289
		k. Governor thrust washer (84)	X	X	X	X			X	X	Contact area for excessive wear
		l. Governor thrust sleeve (83)	X	X	X	X			X	X	Points of contact with governor arm for excessive wear

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	EXAMINE FOR EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
19	Transfer pump	a. Blades (104)	X		X	X			X		Check for chipping on all edges, including spring bore edges for pitting, imbedded foreign particles or scoring on rounded' edges. Determine blade wear by measuring length (0.538 inch minimum). Inspect flat surfaces visually for deep scores (see illustration). If any discrepancies are noted, replace blade sets and springs  TA127290
		b. Liner (103)	X	X	X	X					Inside diameter in low pressure area for wear
20	Governor	a. Pivot shaft (60)	X	X	X			X		X	Chipped or worn knife edge
		b. Arm (56)	X	X	X				X	X	Points of contact with thrust sleeve and pivot shaft for excessive wear

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	EXAMINE FOR								SPECIFICALLY INSPECT
			EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	
INSPECTION (cont)											
20 (cont)		c. Metering valve (53)	X	X	X	X	X		X		Contact area of body for excessive wear
		d. Metering valve arm (55)	X	X	X	X			X	X	Pin for wear or looseness
		e. Linkage hook (54)	X	X	X			X	X	X	Metering valve pin hole
21	Advance	a. Piston (71 and 77)	X	X	X	X	X				
		b. Cam advance screw (80)	X	X	X	X	X	X	X		
		c. Plugs (66, 68, and 74)	X	X	X	X	X	X	X	X	Bore for excessive wear
		d. Head locating screw (64)		X	X	X		X	X		Orifice
22	End plate (88)	a. Sleeve (92)		X							Bypass port for clogging
		b. Regulating piston (98)	X	X	X	X	X				Upper end
		c. End plate (88)	X	X		X		X	X		For wear from transfer pump end thrust

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

			EXAMINE FOR								
STEP	LOCATION	ITEM	EXCESSIVE WEAR	FOREIGN MATERIAL OR RUST	NICKS OR CHIPPING	SCRATCHES OR SCORES	FREEDOM OF MOVEMENT	THREAD DAMAGE	CRACKS	DISTORTION	SPECIFICALLY INSPECT
INSPECTION (cont)											
22 (cont)		d. End plate plug (89)	X					X			Bottom surface
		e. Regulator spring								X	Free length of 0.633 to 0.667 inch, rate of compression 10 pounds per inch
23	Governor control cover (22)	Solenoid frame and arm assembly (24)							X	X	For cracks and swelling in encapsulating material and looseness of screw terminals. Use ohmmeter and check for continuity. Replace if any defects observed or if continuity not obtained

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
		NOTE All parts must be flushed in clean diesel fuel as they are assembled.		
24	Hydraulic head (81)	a. Vent wire (132)	Install in vent wire retainer (131)	
		b. Vent wire retainer (131)	Install	In hydraulic head (81)
		c. Two plug screws (130)	Install	
		d. Plug screw (129)	Install	
25	Housing (133)	a. Nameplate (128)	Position	
		b. Two screws (127)	Install	
		c. Two bushings (134)	Install	Use soft hammer
26	End plate (88)	a. Seal (93)	Install	On sleeve (92)
		b. Filter element (94)	Install	On sleeve (92)
		c. Seal (95)	Install	On sleeve (92)
		d. O-ring (96)	Install	On sleeve (92)
		e. Regulator spring (97)	Install	In sleeve (92)
		f. Regulating piston (98)	Install	On sleeve (92)
		g. Seal (99)	Install	On regulating piston (98)
		h. Sleeve (92)	Install	In end plate (88); be careful not to disturb parts assembled to sleeve. Finger tighten sleeve
		i. Plug (91)	Install	In sleeve (92)
		j. Seal (90)	Install	On plug (89)
		k. Plug (89)	Install	
27	Hydraulic head (81)	**NOTE** Pumping plungers are graded in four sizes A through D in either standard or oversize. The correct grading letter is etched on the rotor (123) base; if a "–2" is also etched on rotor base, this indicates an oversize pumping plunger is required. Absence of a "–2" indicates a standard size plunger in either size A through D, as etched on rotor base, is required.		

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

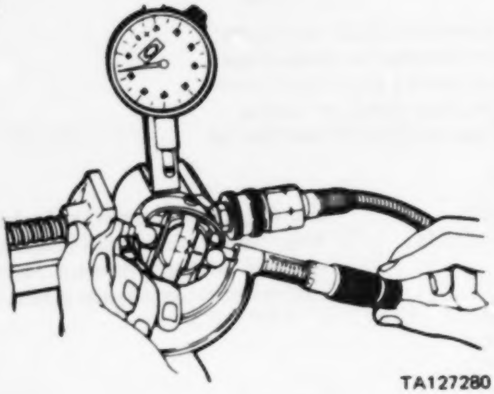
STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
27 (cont)		a. Two pumping plungers (122)	Install in rotor bores	Chamfer inward
		b. Rotor (123)	Flush thoroughly in clean diesel fuel	Don't handle rotor shank; keep your fingers over plungers to stop them from falling out
		c. Hydraulic head (81)	Flush thoroughly in clean diesel fuel	
		d. Rotor (123)	Install using slight rotary motion	In hydraulic head, while both are immersed in clean diesel fuel
		e. Hydraulic head (81) and rotor (123)	Install in holding fixture P/N 19965	
		f. Leaf spring (121)	Position	
		g. Adjusting screw (120)	Install	Use tool P/N 13336
		h. Two cam roller shoes (119) and cam rollers (118)	Install	In rotor (123), then check for freedom of movement
		i. Cam rollers (118)	Check and adjust roller-to-roller dimension: a. Install fixture P/N 19969 in vise b. Assemble 1/4-18 NPT fitting to fixture air inlet c. Adapt fitting to a 30-100 PSI source of clean, dry air	

CAUTION

Handle hydraulic head carefully in following step and hold cam rollers (118) and shoes (119) in their slots to prevent rotor, cam rollers, and shoes from falling.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
27 (cont)	 TA127280			d. Install hydraulic head (81) in fixture on air inlet side of fixture e. Rotate rotor until cam rollers (118) are pushed to their extreme outward position by air pressure f. Use a two inch micrometer and measure cam roller-to-cam roller dimension as shown g. Dimension shall be 1.965±0.0015 inch; if necessary, turn adjusting screw (120) clockwise to decrease travel h. Remove hydraulic head from fixture and install in fixture P/N 19965
		j. Cam ring (116)	Position	On hydraulic head with directional arrow facing upward
		k. Governor weight retainer (115)	Install	Align mark on governor weight retainer (115) with mark on rotor (123)
		l. Retaining ring (114)	Install	Be sure ring is installed in its groove
		m. Hydraulic head (81)	Invert in holding fixture	Be sure governor weight retainer engages bar on holding fixture

NOTE

Delivery valves are supplied in standard size and oversize; size used is etched on rotor.

STEP	LOCATION	ITEM	ACTION	REMARKS
		n. Delivery valve (109)	Install	Be sure it operates freely in its bore
		o. Spring (108)	Install	
		p. New stop (107)	Install	
		q. Delivery valve screw (106)	Install	Relieved end facing down; use tool P/N 13383 and tighten to 85-90 pounds inch torque
		r. Two rotor retainers (111)	Install	Lift hydraulic head up until inside face of head is flush with rotor end, then position with outer sleeve of rotor retaining ring installation tool P/N 13375
		s. Snap ring (110)	Install	
		t. Liner (103)	Install	Install so that large slot is in line with head locating screw hole and marking indicating pump rotation is facing upward

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
27 (cont)		**NOTE** Some rotors (123) have oversized blade slots (0.001 inch wider than normal). Pump blades (104) are furnished in standard size and oversize. Always install oversized pump blades first; if oversized pump blades fit any of the slots, they should be used in those slots. Both oversize and standard size pump blades may be used in the same rotor.		
		u. Four pump blades (104) and two springs (105)	Install in rotor (123)	Rotate liner several times to check for binding; remove and reinstall blades and springs if binding is detected. Position liner in correct position as indicated above
		v. Seal (102)	Install	
		w. Thrust plate (101)	Install	
28	End plate (88)	Rollpin (100)	Install	If removed
29	Hydraulic head (81)	a. End plate (88)	Position	
		NOTE If rollpin (100) in end plate (88) and locating slot in liner (103) are 180 degrees out of alignment, check that rollpin is installed in its proper location as to pump rotation (C and CC are marked on outside of end plate).		
		b. Four washers (87), lock washers (86) and screws (85)	Install	Tighten to 25-30 pounds inch torque
		c. Hydraulic head and rotor	Position with drive end up	
		d. Six governor weights (82)	Install in sockets	Position so that slots face bore of hydraulic head and rotor assembly
		e. Thrust washer (84)	Position	Against thrust sleeve with chamfered edge facing sleeve
		f. Thrust sleeve (83)	Install with tab facing upward	Insert your forefinger into bore of sleeve (83) and washer (84) to hold them together and insert into slots of governor weights (82) by tilting weights back slightly

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (Cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
29 (cont)		g. Six governor weights (82)	Check	Sight across tops of assembled weights to check positioning. One weight higher than others indicates incorrect assembly of thrust washer (84). Disassemble and repeat steps d through g above
30	Housing (133)	a. Governor arm (56)	Position	Fork for linkage hook (54) facing end plate(88)
		b. Governor arm pivot shaft (60)	Install	With knife edge facing end plate (88)
		c. Two seals (59) and pivot shaft nuts (58)	Install	Tighten to 20-25 pounds inch torque
		d. New seal (117)	Position	On hydraulic head (81)

CAUTION

If during following step, the hydraulic head and rotor should cock during installation, withdraw it and start over. Failure to do so could cause particles of metal to be shaved off and left in the housing causing serious damage during operation. Be careful not to insert hydraulic head too far into housing; seal may be damaged and result in leakage.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Hydraulic head (81) and rotor (123)	Apply light film of clean grease around inside edge of housing (133) then install	Rotate cam ring (116) so that unthreaded hole is in line with metering valve bore in housing. Grasp head firmly in both hands and insert into housing bore with a slight rotary motion. Don't force this operation.
		f. Hydraulic head (81)	Align head locking screw holes in head and housing	Align by rotating hydraulic head (81)
		g. Two head locking screws (63)	Install finger tight	

NOTE

To prevent governor weights from dislodging, install drive shaft (5) in pump.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
30 (cont)		h. Pump and fixture	Invert in vise so bottom faces upward	
		i. Two seals (65)	Install	On head locating screw (64)
		j. Head locating screw (64)	Install	Tighten to 180-220 pounds inch torque
		k. Cam advance screw (80)	Install	Use tools P/N 15499 and 15500; tighten to 440-460 pounds inch torque
		l. Seal (78)	Assemble	Into groove of power piston (77)
		m. Piston ring (79)	Assemble	Into groove of power piston (77)
		n. Two seals (69)	Assemble	Into grooves of advance piston hole plug (68)
		o. Two seals (75)	Assemble	Into grooves on power piston hole plug (74)
		p. Shim (73)	Assemble	On spring (72); use small amount of grease to hold in position
		q. Advance adjusting spring (72)	Install	In piston (71)
		r. Piston (71)	Assemble	To advance piston hole plug (68)
		s. Slide washer (70)	Install	On piston (71); use small amount of grease applied to piston end to keep slide washer in position
		t. Advance piston hole plug (68)	Install	Finger tighten
		u. Power piston (77)	Assemble	To power piston hole plug (74); use tool P/N 16199
		v. Slide washer (76)	Assemble	To power piston (77); use small amount of grease applied to piston end to keep slide washer in position
		w. Power piston hole plug (74)	Install	Finger tight

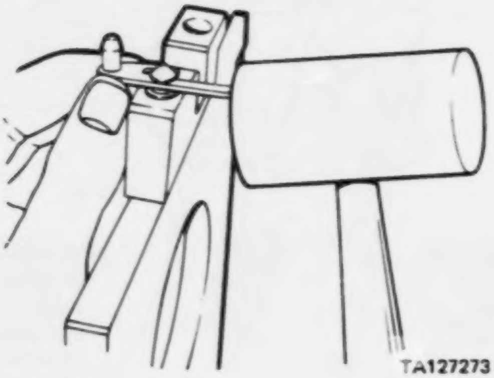
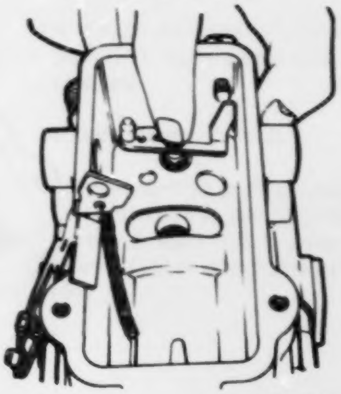
NOTE

Power piston (77) is installed in side of housing marked C for a clockwise rotating pump.

STEP	LOCATION	ITEM	ACTION	REMARKS
		x. New seal (67)	Install	On advance screw hole plug (66)
		y. Advance screw hole plug (66)	Install	Tighten to 180-220 pounds inch torque using tool P/N 14490
		z. Advance piston hole plug (68) and power piston hole plug (74)	Tighten	Tighten to 215-265 pounds inch torque

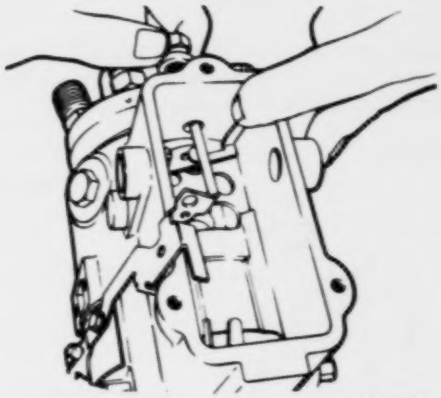
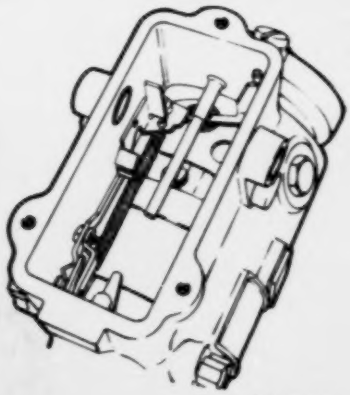
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
31	Metering valve (53)	a. Shim (61)	Position	On metering valve (53)
		NOTE Metering valve is furnished in two sizes: A and B. If original valve has a ring groove cut just below shouldered top crown, order size B for replacement; otherwise order size A.		
		b. Metering valve arm (55)	Install	On metering valve (53) as shown; use soft hammer
		 TA127273		
32	Housing, top	a. Spring (62) b. Metering valve (53), shim (61), metering valve arm (55) and spring (62)	Install Install in its bore	On metering valve (53) Depress and rotate several times to ensure freedom of movement. If valve sticks, lap it with clean diesel fuel  TA127291

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)		c. Washer (49)	Install	On guide stud (44)
		d. Guide stud (44)	Install	Depress metering valve (53) then install as shown; finger tighten
		 TA127292		
		e. Linkage hook (54) and linkage spring (57)	Install	Pull back linkage hook stretching spring (57) just enough to assemble hook correctly to fork on governor arm (56). Position opposite end of hook over pin on metering valve arm (55). Check all parts for freedom of movement
		f. Governor arm (56)	Install	
		 TA127293		

4-3. FUEL SYSTEM MAINTENANCE (cont)

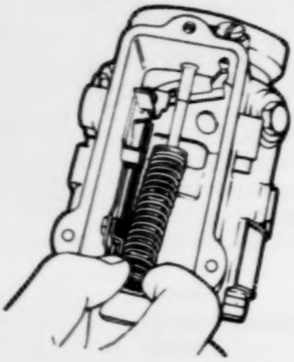
b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)				

NOTE

In following steps where grease is used to keep parts together to ease assembly, use grease sparingly as it can plug return fitting and pump will not bleed air from housing during start-up.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Governor spring (45)	Assemble	Assemble these four parts on bench. Apply a small amount of grease to these parts to keep them in place while assembling. Loosen guide stud and withdraw it just enough to install these parts on it. Tighten guide stud to 110-115 pounds inch torque
		h. Spring retainer (46)	Assemble	
		i. Idle spring (47)	Assemble	
		j. Idling spring guide (48)	Assemble	

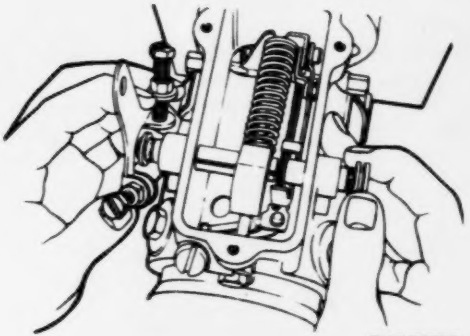


TA127294

STEP	LOCATION	ITEM	ACTION	REMARKS
		k. Two washers (35 and 39) and seals (34 and 38)	Install	On throttle shaft assembly (37) and shutoff shaft (33). Apply a light film of grease to each seal
		l. Throttle shaft assembly (37)	Install	Partially through its bore
		m. Throttle shaft lever (36)	Install	Slide over throttle shaft assembly (37) so that projection in lever (36) bore engages keyway in shaft (37). Position forked end of lever (36) so that it straddles guide stud (44)

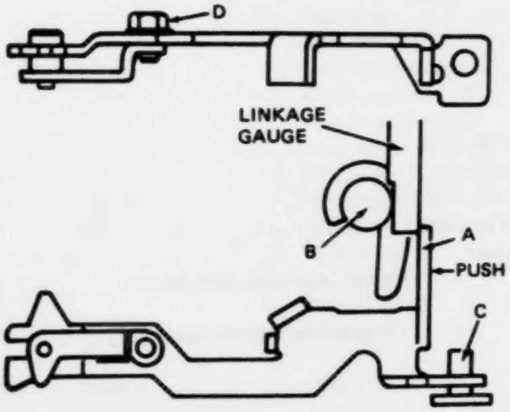
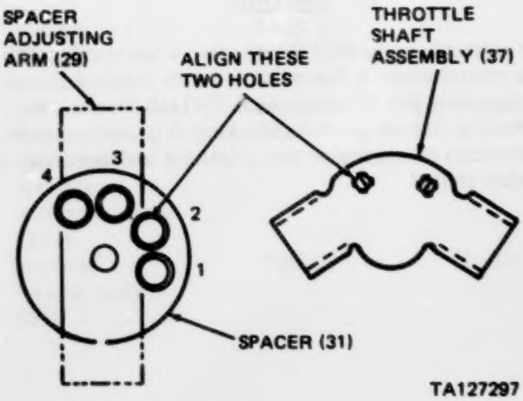
4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)		n. Shutoff shaft (33)	Install	With slight rotary motion so as not to damage seal (34). If throttle shaft lever is installed properly, rotating throttle shaft assembly will cause spring (45) to compress (see illustration below)
				
		o. Shaft retainer clip (32)	Install	
		p. Torque screw (52)	Install	
		q. Seal (51)	Install	In nut (50)
		r. Nut (50) and cap (62A)	Install	On torque screw (52)
		s. Nut (40)	Install	On low idle adjusting screw (41)
		t. Low idle adjusting screw (41)	Install	In throttle shaft assembly (37)
		u. Nut (42)	Install	On high idle adjusting screw (43)
		v. High idle adjusting screw (43)	Install	In throttle shaft assembly (37)

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
32 (cont)		w. Linkage	Adjust linkage gap to 0.125-0.165 inch as follows: a. Loosen nut (50) and back out torque screw (52) b. Hold throttle shaft lever (36) in wide open position c. Using tool P/N 18914, measure clearance between rear of shutoff shaft (point B, illustration) and vertical tab (point A) on linkage hook (54) **NOTE** Adjustment is accomplished by changing the effective length of linkage hook (54) using linkage hook wrench tool P/N 13379. d. With linkage adjusting screw (point D) tight, apply a slight pressure to vertical tab (point A). At the same time, rotate pump one or two revolutions to ensure that linkage is in full forward position e. Loosen linkage adjusting screw (point D) and slide linkage to maximum open length f. Insert tool P/N 18914 between vertical tab (point A) and shutoff shaft (point B) and slide linkage hook together from rear until face of tab is flush against gauge g. Tighten linkage adjusting screw (point D) h. Check adjustment and reset if necessary	
 TA127296				
33	Housing, side	a. Spacer (31)	Position; line up holes shown	
 SPACER ADJUSTING ARM (29) ALIGN THESE TWO HOLES THROTTLE SHAFT ASSEMBLY (37) 3 4 2 1 SPACER (31) TA127297				

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
33 (cont)		b. Screw (30)	Install	
		c. Spring retainer (26)	Install	On screw (25)
		d. Throttle lever spring (27)	Position	On screw (25)
		e. Spacer adjusting arm (29)	Position	On spacer, in recess
		f. Throttle lever assembly (28)	Position	On spacer adjusting arm (29)
		g. Screw (25), spring retainer (26), and throttle lever spring (27)	Install	Finger tight
		h. Throttle lever spring (27)	Position; cross ends over each other to clamp throttle lever (28) and arm (29) together	
		i. Screw (25)	Tighten	To 35-40 pounds inch torque
34	Governor control cover (22)	a. Solenoid frame and arm assembly (24)	Position	On governor control cover (22)
		b. Two insulating washers (20) and washers (19)	Install	
		c. Two nuts (18)	Install	Tighten to 20-25 pounds inch torque
35	Housing, top	a. Gasket (23)	Position	

CAUTION

Exercise extreme care in the following step when installing governor control cover. It is possible to locate solenoid shutoff arm on the wrong side of linkage hook (54) tab, thus locking linkage hook in full run position, blocking all governor action. If this condition exists, engine may accelerate to dangerously high speeds when started.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
35 (cont)		b. Governor control cover (22)	Install	Back-out low idle screw (41) and push throttle lever (36) into shutoff position. Move cover (22) down toward pump in a position further toward drive shaft end than normal. Just before cover (22) touches housing, slide cover into alignment with housing
		c. Two lock washers (16 and 17)	Position	
		d. Grounding strap (15)	Position	
		e. Three washers (12), lock washers (11) and screws (10)	Install	Tighten to 35-45 pounds inch torque
		f. Washer (14) and two nuts (13)	Install	
		g. Connector (21)	Install	Tighten to 200 pounds inch torque
		h. Throttle shaft assembly (37)	Wire in wide open position	
		i. Drive shaft (5)	Remove	
		j. Pilot tube seal (8)	Install	
36	Drive shaft (5)	Roll pin (7)	Install	

NOTE

Place two new seals (6), drive shaft (5), lock washer (4), nut (3), spring (2), and thrust plunger (1) in a small cloth bag; these parts will be assembled when fuel injection pump is installed. Attach bag to fuel injection pump securely.

STEP	LOCATION	ITEM	ACTION	REMARKS
37	Housing, sides	a. Two gaskets (126)	Position	
		b. Two timing line covers (125)	Position	
		c. Four screws (124)	Install	Tighten to 15-20 pounds inch torque
		d. Eight washers (113) and four fuel line connector screws (112)	Install	
		e. Two head locking screws (63)	Tighten	To 360 pounds inch torque

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

<table>
<tr><th>STEP</th><th>LOCATION</th><th>ITEM</th><th>ACTION</th><th>REMARKS</th></tr>
<tr><td colspan="5">TESTING</td></tr>
<tr><td colspan="5">NOTE
Test bench must use calibrating nozzles type DN12SD12 (opening pressure 2500 psi) and injection lines shall be 3/32 inch ID by 20 inches long; holder BKB50SD and 0.5 MM plate and lines 1/16 inch ID by 25 inches long; Mobil Velocite No. 3 calibrating oil and calibrating oil temperature at 110-115 degrees F. Test stand coupling should be of the self-aligning zero backlash type. Mount and drive the pump according to the test bench manufacturer's instructions.</td></tr>
<tr><td>38</td><td>Transfer pump (end plate (88))</td><td>a. Plug (91)</td><td>Remove</td><td></td></tr>
<tr><td></td><td></td><td>b. Sleeve (92)</td><td>Install pump inlet connector</td><td>Use two wrenches so pump outlet fitting does not move at the same time. Install transfer pressure gauge adapter P/N 21900, then a shutoff valve to isolate gauge when not in use. Connect pressure gauge to adapter P/N 21900</td></tr>
<tr><td>39</td><td>Housing</td><td>a. Four screws (124)</td><td>Remove</td><td>Install P/N 19918 advance windows in place of timing line covers</td></tr>
<tr><td></td><td></td><td>b. Two timing line covers (125)</td><td>Remove</td><td></td></tr>
<tr><td colspan="5">NOTE
Pump rotation is counterclockwise as viewed from drive shaft end of pump.
Connect a +24 Vdc battery and switch to solenoid terminals at top of governor control cover (22)</td></tr>
<tr><td></td><td></td><td>c. Switch connected to battery</td><td>Place in on position</td><td></td></tr>
<tr><td></td><td></td><td>d. Pump throttle shaft assembly (37)</td><td>Move to full load position</td><td>When transfer pump is primed, bleed fuel for several seconds by loosening injection line nuts at fuel nozzles; then tighten nuts securely</td></tr>
<tr><td colspan="5">NOTE
1 to 3 PSI supply pressure is required at pump inlet.</td></tr>
</table>

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
40	Test stand	Pump	Operate pump at 1000 RPM wide open throttle for 10 minutes	Dry pump off completely with compressed air. Check for leaks and correct if necessary
41	Housing	a. Low idle adjusting screw (41)	Back out	
		b. High idle adjusting screw (43)	Back out	
		c. Torque screw (52)	Back out	
		d. Vacuum check	a. Close shutoff valve in fuel supply line	
			b. Operate pump at 400 RPM	Transfer pump must create a vacuum of at least 18 inches of mercury. If not, check for air leaks between pump inlet and shut-off valve or deficiencies in transfer pump components
		e. Return oil check	a. Fill graduates to bleed air from test stand and to wet graduates	
			b. Operate pump at 2100±10 RPM	Direct return oil flow into calibrated graduate. Return oil flow shall be 200±500CC/minute

CAUTION

Under no circumstances exceed 130 PSI when performing the following.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Transfer pump pressure check	Operate pump at 2100±10 RPM	Transfer pump pressure shall be 67-71 PSI

NOTE

Transfer pump pressure gauge must be isolated by the shutoff valve at injection pump when checking fuel delivery and advance movement.

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
41 (cont)				
		g. Minimum delivery check	Operate pump at 150 ±10 RPM	Minimum delivery shall be 25 cubic MM/stroke
		h. High speed delivery check	Operate pump at 2300 ±10 RPM	High speed delivery shall be 11-14 cubic MM/stroke; if necessary adjust high idle screw (43) to obtain correct delivery. Repeat pressure check above
		i. Low idle delivery check	Operate pump at 750 ±10 RPM	Low idle delivery shall be 10-13 cubic MM/stroke. If necessary adjust low idle screw (41) to obtain correct delivery
		j. Automatic advance check	a. Observe advance window	Each line on advance window equals two pump degrees; cam (116) has a line etched on it which is observed at window
			b. Operate pump at 650-950 RPM	Cam movement shall be 1 degree
			c. Operate pump at 1250-1450 RPM	Cam movement shall be 5 degrees
			d. Operate pump at 1700-1900 RPM	Full advance (8 –0 + 1 degrees)
			e. Set test stand for zero RPM at pump	Check that cam returns to its initial position. Recheck transfer pump pressure
		k. Fuel delivery	a. Operate pump at 1400 ±10 RPM	Fuel delivery shall be 61 ±1.5 cubic MM/stroke
			b. Operate pump at at 150 ±10 RPM	Fuel delivery shall be 25 cubic MM/stroke minimum
			c. Operate pump at 2300 ±10 RPM	Fuel delivery shall be 11-14 cubic MM/stroke

4-3. FUEL SYSTEM MAINTENANCE (cont)

b. Fuel Injection Pump (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
TESTING (cont)				
41 (cont)				
			d. Operate pump at 750 ±10 RPM	Fuel delivery shall be 10-13 cubic MM/ stroke
		l. Torque screw adjustment	a. Operate pump at 2100 ±10 RPM	Adjust torque screw (52) until fuel delivery of 58-60 cubic MM/stroke is obtained
			b. Operate pump at 150 ±10 RPM	Fuel delivery shall be 25 cubic MM/stroke
		m. Governor cut-off check	Operate pump at 2350 ±10 RPM	Fuel delivery shall be 5 cubic MM/stroke maximum
		n. Shutoff check	Operate pump at 2100 ±10 RPM	Disconnect + 24 Vdc from solenoid; fuel delivery shall be 3 cubic MM/stroke maximum
		o. Nut (40, 42)	Tighten	25-30 pounds inch torque
		p. Nut (50)	Tighten	25-30 pounds inch torque
		q. Two advance windows	Remove	Install timing line covers (125) in its place. Tighten four screws (124) to 15-20 pounds inch torque
		r. Throttle	Lock wire in wide open throttle position	
		s. Pump	Remove from test stand	
42	End plate (88)	Four screws (85)	Thread lock wire through head of each screw	
43	Governor control cover (22)	Rear screw (10) and torque screw (52)	Lock wire together	
44	Throttle shaft assembly (37)	Screws (41 and 43)	Lock wire individually to lever	

Section II. POWER TRAIN MAINTENANCE

This section contains maintenance procedures for the transmission and the front and rear differential assemblies.

	Para
Transmission Maintenance	4-4
Torque Converter Group	4-4a
Converter Housing	4-4b
Transmission Rear Cover	4-4c
Gear and Clutch Group	4-4d
Transmission Housing	4-4e
Reverse and Second Clutch Assembly	4-4f
Low Clutch Assembly	4-4g
Third Clutch Assembly	4-4h
Forward Clutch Assembly	4-4i
Control Valve Assembly	4-4j
Modulation Valve Assembly	4-4k
Axle Maintenance	4-5
Differential Carrier	4-5a
Differential Case and Gear Assembly	4-5b

4-4. TRANSMISSION MAINTENANCE

a. Torque Converter Group.

This task covers:
- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Reassembly

INITIAL SETUP

TOOLS

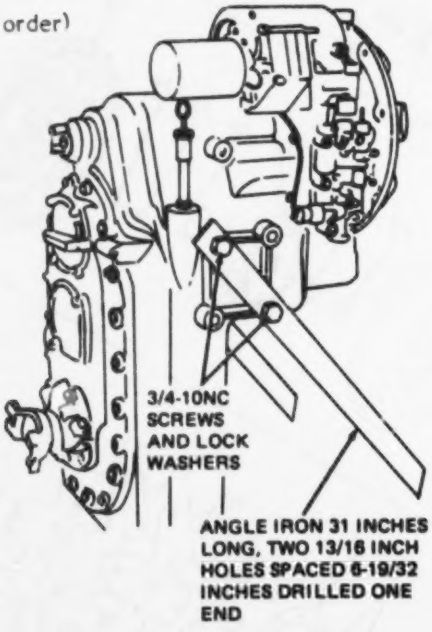
Oven	
Mechanical Puller	NSN 5120-00-423-1596
Chain Hoist, 1/2 ton capacity	
Tongs	
Sleeve, 2-1/4 inches diameter	
Soft Hone	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

MATERIALS/PARTS

Light oil	
Cleaning solvent P-D-680	
Clean cloths	
Thread sealant	NSN 8030-01-014-5869
Gaskets	
O-rings	
Locating rings	
Sealing rings	
Retaining rings	
Chassis grease	
OE10 (refer to current lubrication order)	
Loctite 529	

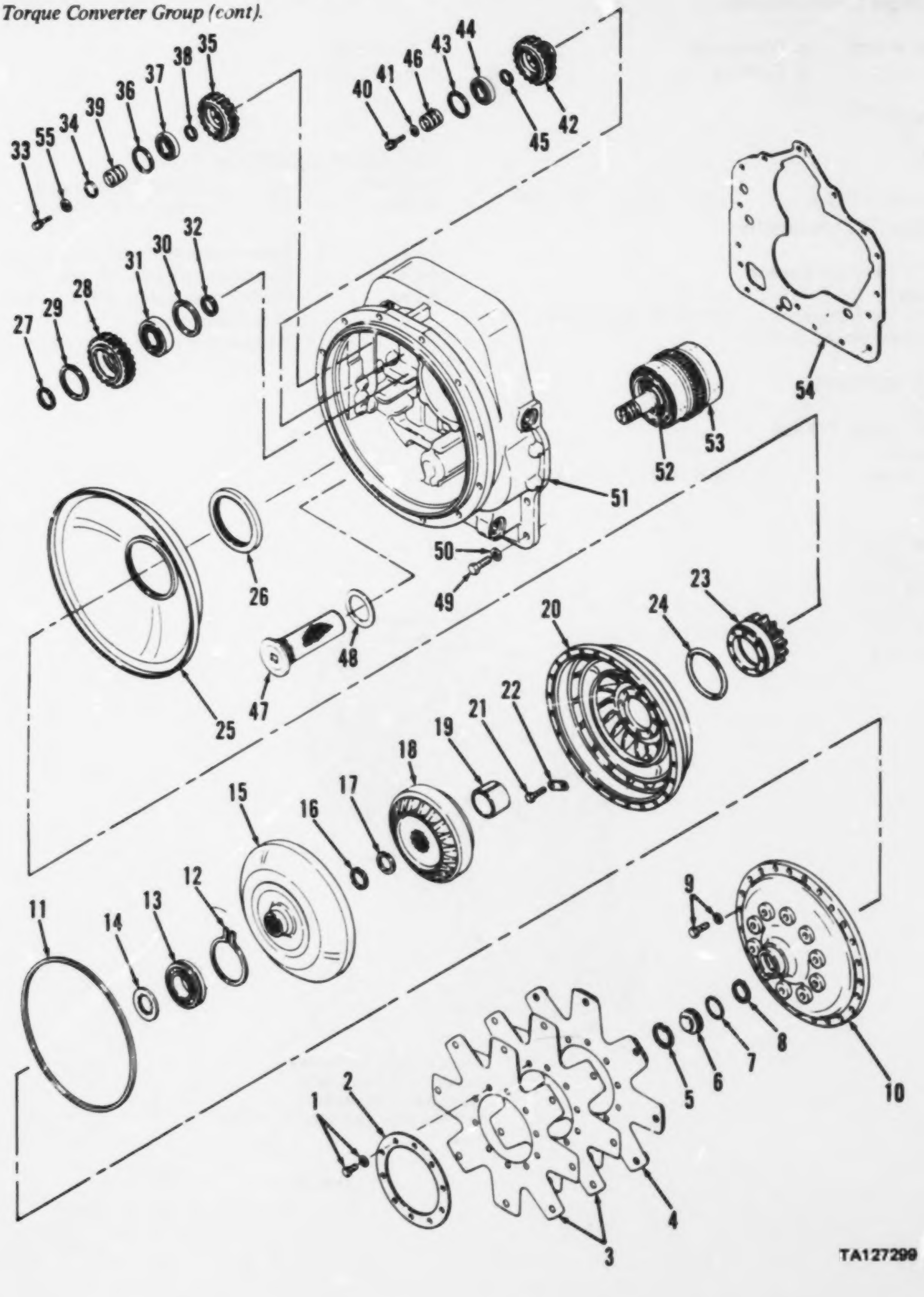
EQUIPMENT CONDITION

Paragraph	Condition Description
2-38a(1)	OE10 drained from transmission.
3-5d	Transmission separated from engine.
3-19e	Charging pump assembly removed.
3-19d	Control valve and modulation valve assemblies removed.
	Transmission supported as shown below:


3/4-10NC SCREWS AND LOCK WASHERS
ANGLE IRON 31 INCHES LONG, TWO 13/16 INCH HOLES SPACED 6-19/32 INCHES DRILLED ONE END
TA127298

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).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4-4. TRANSMISSION MAINTENANCE (cont)

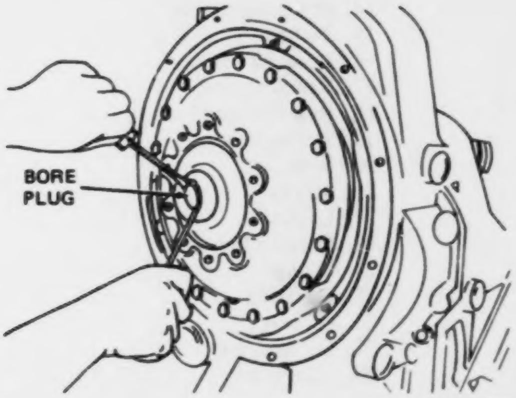
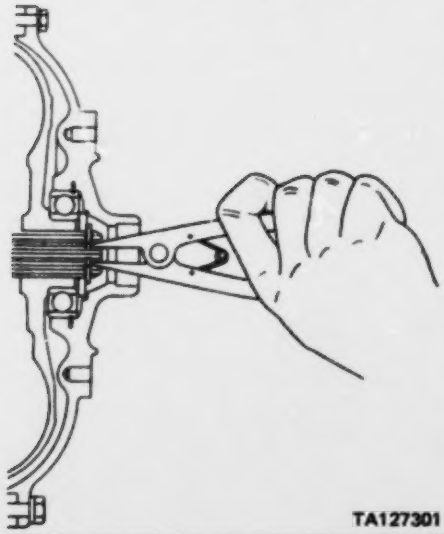
a. Torque Converter Group (cont).

KEY

1. Screws and lock washers
2. Backing ring
3. Drive plates
4. Drive plate assembly
5. Retaining ring
6. Bore plug
7. O-ring
8. Turbine retaining ring
9. Screws and lock washers
10. Impeller cover
11. O-ring
12. Retaining ring
13. Bearing
14. Retaining washer
15. Turbine
16. Locating ring
17. Retaining ring
18. Reaction member
19. Bearing spacer
20. Impeller
21. Screws
22. Lock tab
23. Impeller hub gear
24. O-ring
25. Oil baffle
26. Oil seal
27. Locating ring
28. Idler gear
29. Retaining ring
30. Retaining ring
31. Bearing
32. Locating ring
33. Screws
34. Locating ring
35. Pump drive gear
36. Retaining ring
37. Bearing
38. Locating ring
39. Bearing support
40. Screws
41. Lock washers
42. Auxiliary pump drive gear
43. Retaining ring
44. Bearing
45. Locating ring
46. Bearing support
47. Screen assembly
48. Gasket
49. Screws
50. Lock washers
51. Converter housing
52. Retaining ring
53. Reverse and second clutch assembly
54. Gasket
55. Lock washers

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Front of transmission	a. 10 screws and lock washers (1)	Remove	
		b. Backing ring (2)	Remove	
		c. Two drive plates (3)	Remove	
		d. Drive plate assembly (4)	Remove	
		e. Retaining ring (5)	Remove	
		f. Bore plug (6) and O-ring (7)	Remove	Use two small screwdrivers as shown to remove bore plug  TA127300
		g. Turbine retaining ring (8)	Remove	Remove through bore plug hole as shown  TA127301
		h. 18 screws and lock washers (9)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

DISASSEMBLY (cont)

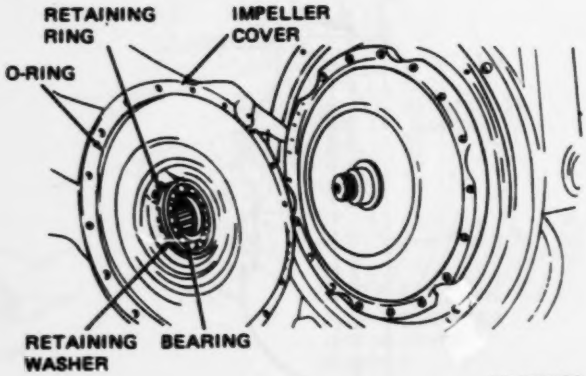
1 (cont)

NOTE

In the following step, turbine (15) may remain in impeller cover bearing (13) and come off with impeller cover (10).

Before performing the next step place container under converter housing to catch oil.

STEP	LOCATION	ITEM	ACTION	REMARKS
		i. Impeller cover (10)	Remove	



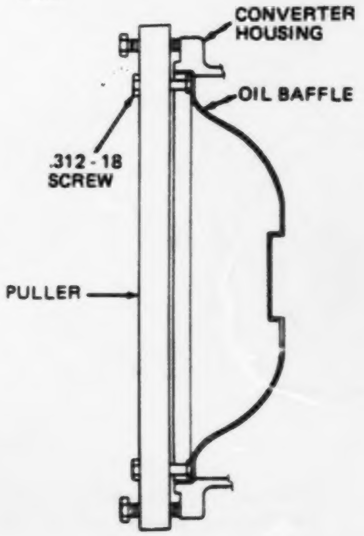
TA127302

STEP	LOCATION	ITEM	ACTION	REMARKS
2	Impeller cover	a. O-ring (11)	Remove and discard	If turbine (15) remained in impeller cover (10) bearing, remove turbine using a puller if necessary
		b. Retaining ring (12)	Remove and discard	
		c. Bearing (13)	Remove	Press using proper size sleeve
		d. Retaining washer (14)	Remove	
3	Transmission, front	a. Turbine (15)	Remove	
		b. Locating ring (16)	Remove and discard	
		c. Retaining ring (17)	Remove and discard	
		d. Reaction member (18)	Remove	
		e. Bearing spacer (19)	Remove	
		f. Impeller (20)	Remove	Remove impeller (20) and hub gear (23) as an assembly

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
4	Impeller	a. Eight screws (21) b. Lock tab (22) c. Impeller hub gear (23) d. O-ring (24)	Remove Remove Remove Remove and discard	
5	Transmission, front	Oil baffle (25)	Remove	Use oil baffle puller holes as shown to remove



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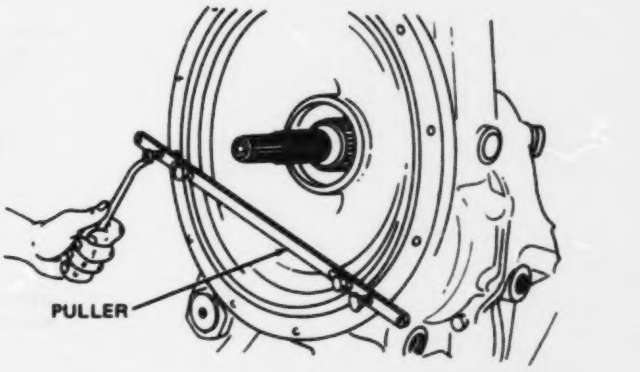

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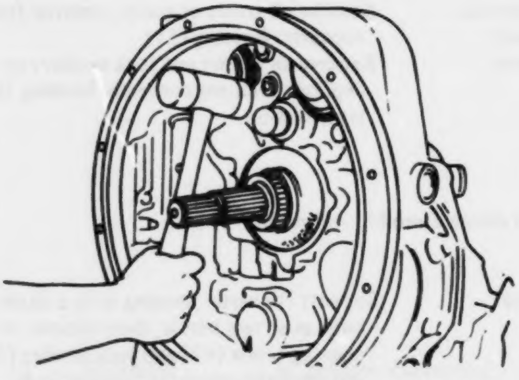
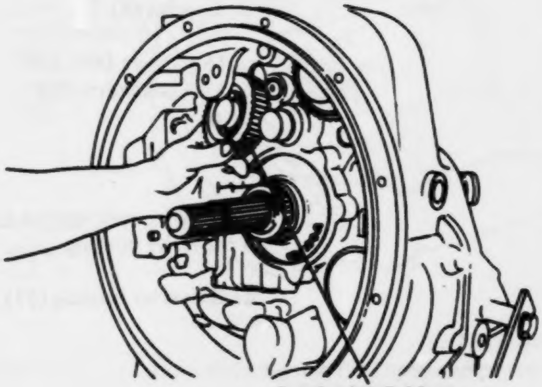
STEP	LOCATION	ITEM	ACTION	REMARKS
6	Oil baffle	Oil seal (26)	Remove	
7	Idler gear	a. Locating ring (27)	Remove and discard	
		b. Idler gear (28)	Remove	Remove idler gear (28) and bearing (31) as an assembly
		c. Retaining ring (29 and 30)	Remove and discard	
		d. Bearing (31)	Remove	Press from idler gear (28) using proper size sleeve
		e. Locating ring (32)	Remove and discard	
8	Pump drive gear	a. Two screws (33) and lock washers (55)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
8 (cont)		b. Pump drive gear (35)	Remove	Use a soft hammer and tap pump drive gear (35) and bearing support (39) from housing as shown below then remove as an assembly
		c. Locating ring (34)	Remove and discard	
				
		d. Retaining ring (36)	Remove and discard	
		e. Bearing (37)	Remove	
		f. Locating ring (38)	Remove and discard	
		g. Bearing support (39)	Remove	
9	Auxiliary pump drive gear	a. Two screws (40)	Remove	
		b. Two lock washers (41)	Remove	
		c. Auxiliary pump drive gear (42)	Remove	Use soft hammer and tap auxiliary pump drive gear (42) and bearing support (46) from housing
		d. Retaining ring (43)	Remove and discard	
		e. Bearing (44)	Remove	
		f. Locating ring (45)	Remove and discard	
		g. Bearing support (46)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

DISASSEMBLY (cont)

NOTE

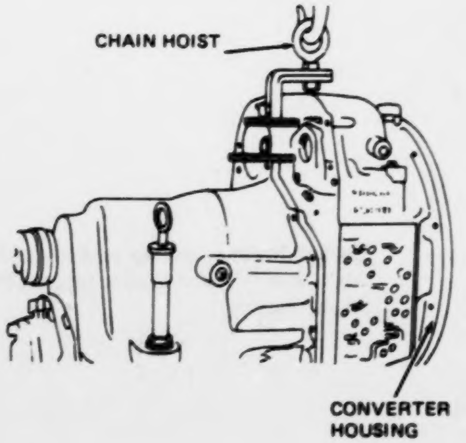
Before performing next step, position container under screen assembly (47) to catch hydraulic fluid.

STEP	LOCATION	ITEM	ACTION	REMARKS
10	Transmission, front	a. Screen assembly (47)	Remove	
		b. Gasket (48)	Remove and discard	Remove all traces of gasket material from converter housing (51)
		c. 16 screws (49) and lock washers (50)	Remove	Remove all screws and lock washers except one securing converter housing to transmission

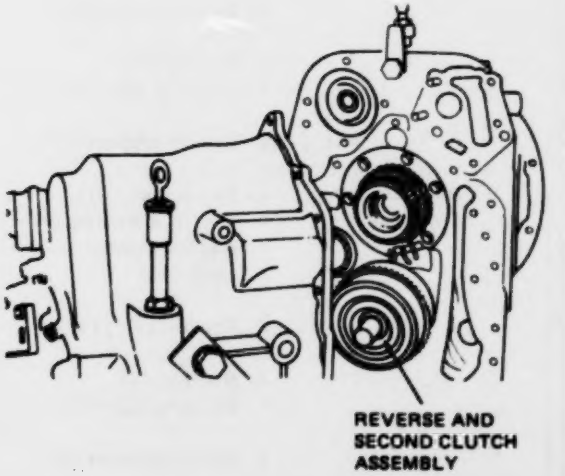
NOTE

In following step, reverse and second clutch assembly will remain in converter housing.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Converter housing (51)	Remove	Support converter housing with a chain hoist as shown below, then remove remaining screw (49) and lock washer (50) and separate converter housing from transmission



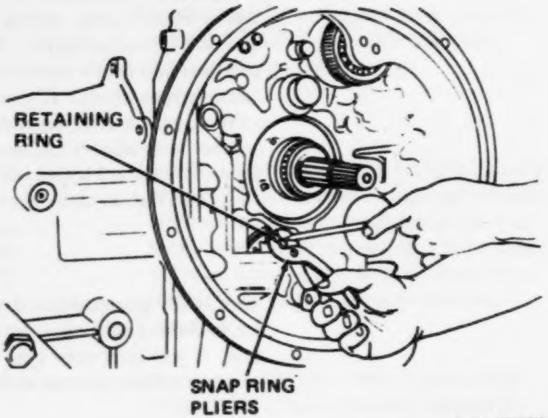
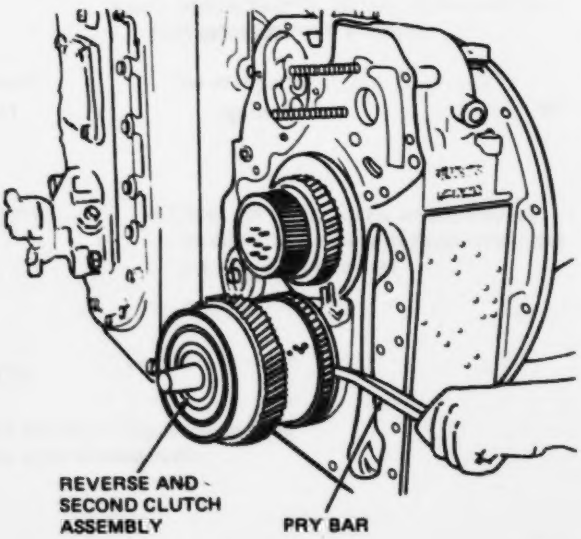
TA127307



TA127308

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
11	Converter housing	Retaining ring (52)	Spread ears	Use spreading type snap ring pliers to spread ears on reverse and second clutch assembly front bearing retaining ring as shown  RETAINING RING SNAP RING PLIERS TA127309
12	Converter housing, rear	a. Reverse and second clutch assembly (53)	Remove	Hold retaining ring (52) open and pry reverse and second clutch assembly from converter housing  REVERSE AND SECOND CLUTCH ASSEMBLY PRY BAR TA127310
		NOTE Refer to paragraph 4-4f for repair of reverse and second clutch assembly.		
		b. Gasket (54)	Remove and discard	

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
13		All parts except bearings (13, 31, 37, and 44), converter housing (51) and reverse and second clutch assembly (53)	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move up and down slowly until all old lubricant and foreign material is dissolved. Dry parts thoroughly after removal from cleaning solvent with moisture free compressed air or clean cloths
14		Bearings	Clean	Use cleaning solvent P-D-680. Immerse bearings in cleaning solvent and slowly move up and down. Remove bearings from cleaning solvent and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning solvent and repeat above operation until bearings are thoroughly clean. Dry using moisture free compressed air. Direct air stream across bearing to avoid spinning. Don't spin bearings when drying them; bearings may be rotated slowly by hand to facilitate drying

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
15		Converter housing (51)	Clean	Use clean cloths moistened with cleaning solvent P-D-680. Dry with moisture free compressed air
16		Reverse and second clutch assembly (53)	Clean	Use clean cloths moistened with cleaning solvent P-D-680. Dry with moisture free compressed air
INSPECTION				
17		Bearings	Inspect	Inspect for wear, chipping, or nicks. Don't replace a bearing cone or cup individually without replacing mating cup or cone at same time. After inspection, dip bearings in clean, light oil and wrap in clean lintless cloth or paper for protection until installed.
18		Gears and shafts	Inspect	Inspect gear teeth for wear, pitting, chipping, nicks, cracks or scores; replace if these defects are observed. If gear teeth show spots where case hardening is worn through or cracked, replace gear. Remove small nicks with suitable hone. Inspect shafts for bent, sprung, or twisted condition; replace if necessary
19		O-rings, metal sealing rings, gaskets, retaining rings, and locating rings	Discard	Use new parts
20		Remaining parts	Inspect	Check for wear, cracks, bent condition, or distortion. If any of these conditions are noted, replace part
REASSEMBLY				

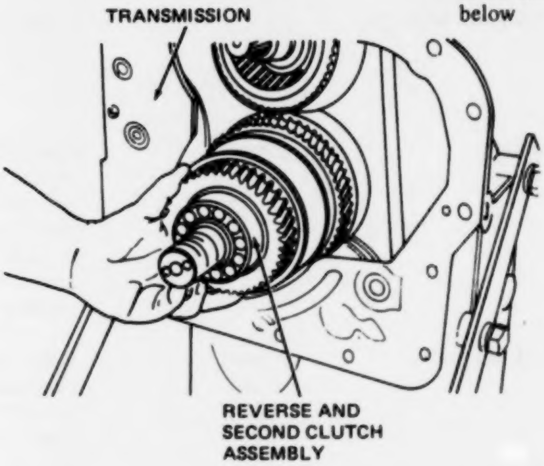
NOTE

Lubricate all seals and O-rings with automatic transmission fluid (refer to current lubrication order) prior to reassembly.

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
21	Transmission	a. Reverse and second clutch assembly (53)	Position	On disc hub. Be sure you align splines of disc hub with internal teeth of second clutch friction discs. Disc hub must be in full position with friction discs. Don't force this operation; see illustration below



TA127311

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Gasket (54)	Position	Place new gasket on front of transmission housing; apply a thin coat of chassis grease to hold gasket in place
		c. Retaining ring (52)	Spread ears	Use spreading type snap ring pliers to spread ears. Lock pliers open to hold retaining ring open

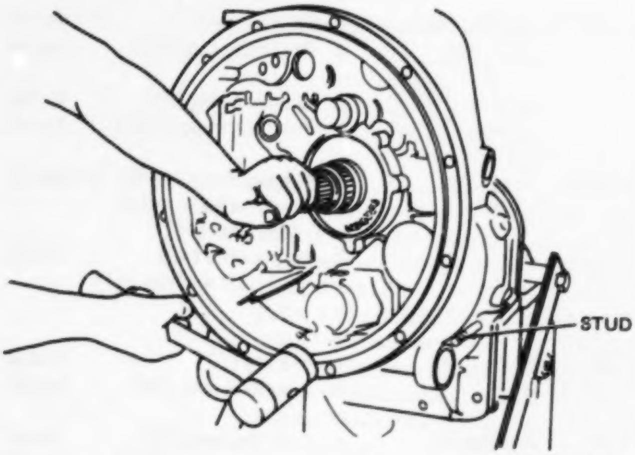
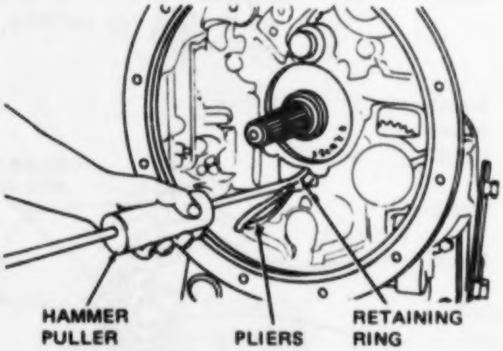
CAUTION

When performing following step, take care not to damage reverse clutch front piston ring.

STEP	LOCATION	ITEM	ACTION	REMARKS
		d. Converter housing (51)	Position	Install a stud in any one mounting hole in transmission housing to aid in installing converter housing. Then using a chain hoist, position converter housing on transmission and tap converter housing in place as shown below

4-4. TRANSMISSION MAINTENANCE (cont)

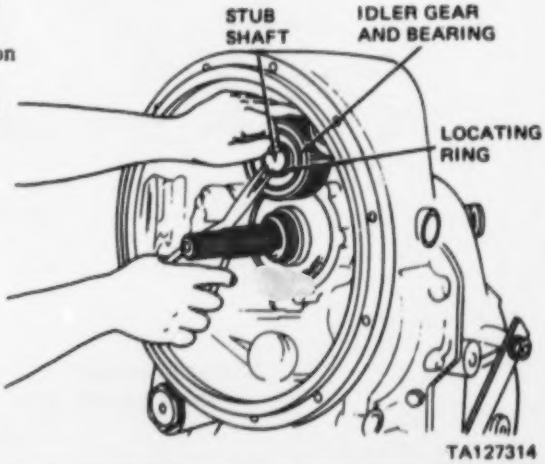
a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
21 (cont)				 TA127312
22	Converter housing, front	a. Screws (49) and lock washers (50)	Install	Install one screw and lock washer in front and one in rear. Use a slide type hammer puller as shown, and pull reverse clutch gear toward front of converter housing to move reverse and second clutch assembly forward to align retaining ring groove in bearing with retaining ring (52) in housing. Be sure retaining ring (52) is in full position in ring groove before removing pliers. Remove aligning stud and install screws (49) and lock washers (50); tighten screws to 37-41 pounds foot torque
		 TA127313		
		b. Gasket (48) and screen assembly (47)	Install	Position new gasket on screen assembly; install screen assembly and tighten to 10-15 pounds foot torque

4-4. TRANSMISSION MAINTENANCE (cont)

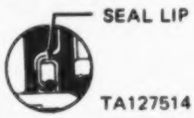
a. Torque Converter Group (cont).

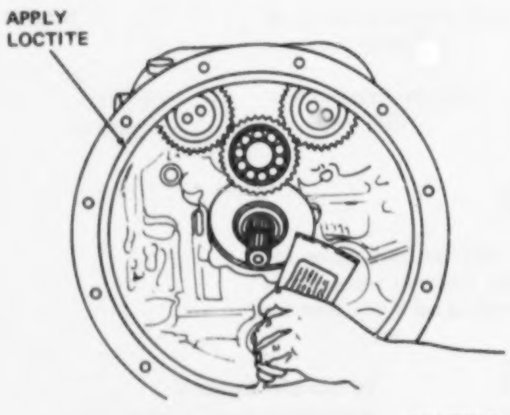
STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
23	Auxiliary pump drive gear	a. Bearing (44)	Install	
		b. Retaining ring (43)	Install	
24	Bearing support	a. Locating ring (45)	Install	
		b. Pump drive gear (42)	Install	
25	Converter housing	a. Bearing support (46) and auxiliary pump drive gear (42)	Install	
		b. Two screws (40) and lock washers (41)	Install	Snug screws to hold bearing support in place, then tighten to 23-25 pounds foot torque
26	Pump drive gear	a. Bearing (37)	Install	
		b. Retaining ring (36)	Install	
27	Bearing support (39)	a. Locating ring (38)	Install	
		b. Pump drive gear (35)	Install	Install until gear shoulders on locating ring
		c. Locating ring (34)	Install	
28	Converter housing	a. Bearing support (39) and pump drive gear (35)	Position	
		b. Three screws (33) and lock washers (55)	Install	Snug screws to hold bearing support and gear in place, then tighten to 23-25 pounds foot torque
29	Idler gear	a. Locating ring (32)	Install	On stub shaft
		b. Bearing (31)	Install	
		c. Retaining ring (29 and 30)	Install	
		d. Idler gear (28) and bearing (31)	Position	
		e. Locating ring (27)	Install	



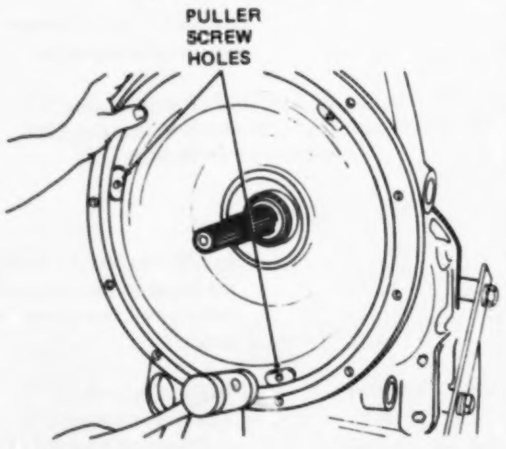
4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
30	Oil baffle	Oil seal (26)	Install	Install with lip of seal positioned as shown  TA127514
31	Converter housing	Oil baffle (25)	Install	Apply a light coat of thread sealant to outer diameter of oil baffle of counter bore in converter housing as shown. Immediately remove any excess sealant that could enter oil circuit. Position oil baffle puller screw holes 15 to 30 degrees either side of vertical center line. Tap baffle (on outside diameter only) into position until baffle shoulders in converter housing; see illustration below



TA127315



TA127316

STEP	LOCATION	ITEM	ACTION	REMARKS
32	Impeller	a. O-ring (24)	Install	
		b. Impeller hub gear (23)	Install	
		c. Lock tab (22)	Position	
		d. Eight screws (21)	Install	Bend lock tabs (22) over head of screws

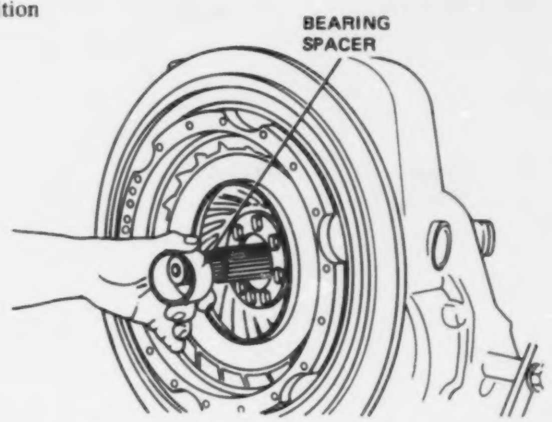
CAUTION

In following step, take care not to damage oil baffle oil seal (26)

STEP	LOCATION	ITEM	ACTION	REMARKS
33	Converter housing	a. Impeller (20)	Install	

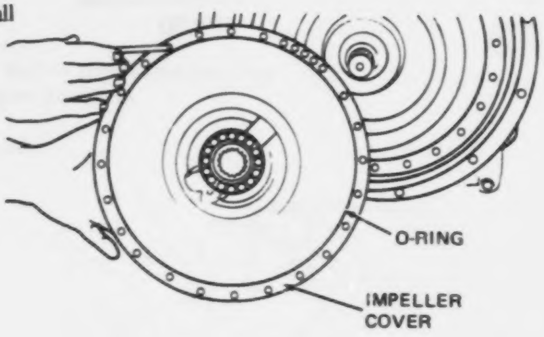
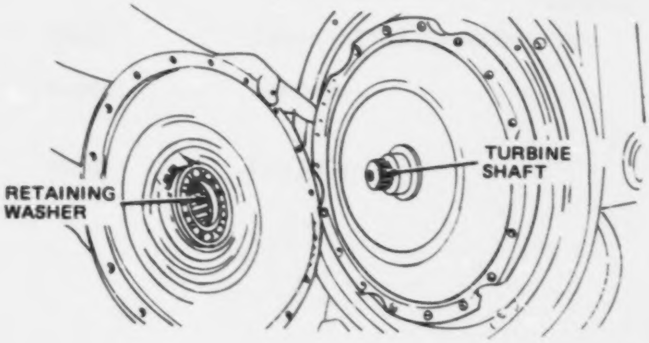
4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
33 (cont)		b. Bearing spacer (19)	Position	 TA127317
		c. Reaction member (18)	Install	
		d. Retaining ring (17)	Install	
		e. Locating ring (16)	Install	
		f. Turbine (15)	Install	
		WARNING In following steps (34a through 34d), wear insulated gloves or use tongs to handle impeller cover (10). Failure to do so could cause you to burn your hands. Get medical aid if you burn your hands.		
34	Impeller cover	a. Impeller cover (10)	Heat	To 200-250 degrees F
		b. Retaining ring (12)	Position	In groove in impeller cover (10)
		c. Retaining washer (14)	Install	
		d. Bearing (13)	Install	While impeller cover (10) is hot, press bearing into position while spreading ears on retaining ring (12). Align ring groove in bearing with retaining ring (12) then release retaining ring. Check retaining ring to be sure it is in full position in groove

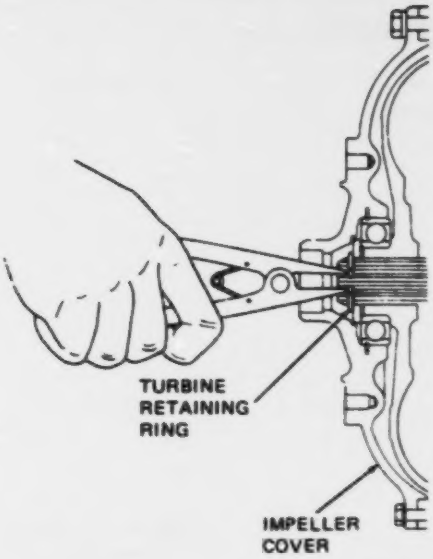
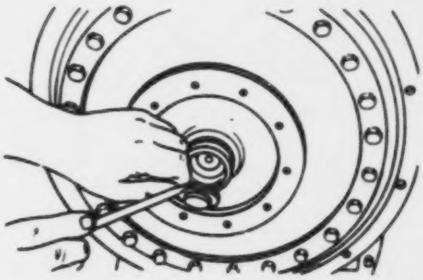
4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
34 (cont)		e. O-ring (11)	Install	 TA127318
		CAUTION Be careful when you install assembled impeller cover (10) not to damage O-ring (11).		
35	Converter housing	a. Assembled impeller cover (10)	Install	Install in impeller (20). Be sure you align retaining washer (14) with turbine shaft (see illustration below)  TA127319
		b. 18 screws and lock washers (9)	Install	Tighten 11 inch impeller cover screws to 12-16 pounds foot torque; tighten 12 inch impeller cover screws to 23-25 pounds foot torque

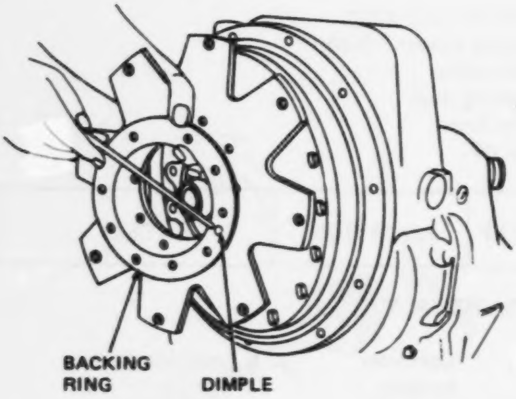
4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
35 (cont)		c. Turbine retaining ring (8)	Install	 TA127320
		d. O-ring (7) and bore plug (6)	Position and lubricate	Lubricate new O-ring with OE10 (refer to current lubrication order), and place on bore plug, then install plug as shown.  TA127321
		e. Retaining ring (5)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

a. Torque Converter Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
35 (cont)		**NOTE** In following step, two dimples 180 degrees apart in backing ring must be facing outward (toward engine flywheel).		
		f. Drive plate assembly (4), two drive plates (3), and backing ring (2)	Position	 TA127322
		g. 10 screws and lock washers (1)	Install	Tighten to 23-25 pounds foot torque
		h. Control valve and modulation valve assemblies	Install	Para 3-19d
		i. Charging pump assembly	Install	Para 3-19e

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

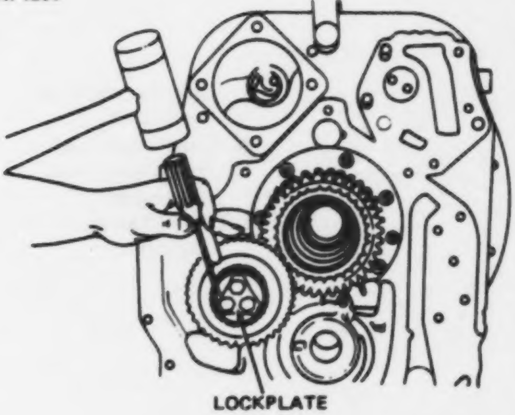
TOOLS

Hot Solution Tank with Mild Alkali Solution	
Sleeve, 2 inches diameter	
Sleeve, 2-1/8 inches diameter	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654
Collar Type Bearing Puller	
Soft Hone	
Mechanical puller	NSN 5120-00-423-1596

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Retaining rings
Piston rings
Light oil

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4a	Torque converter group disassembled.

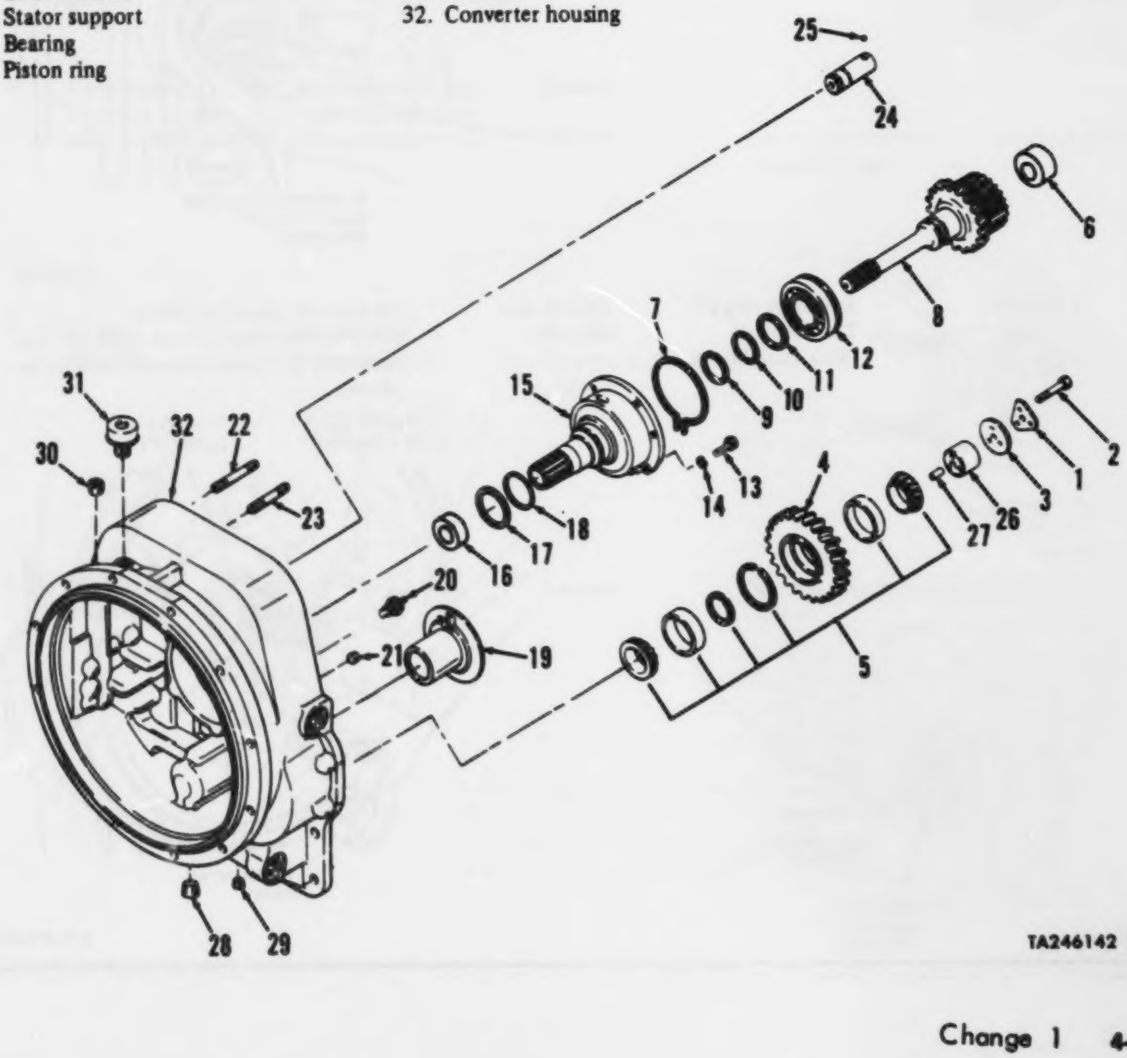
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Converter housing rear	a. Lockplate (1)	Straighten tabs	
		b. Three screws (2)	Remove	
		c. Bearing retainer plate (3)	Remove	
		d. Reverse idler gear (4)	Remove	Use puller
		e. Bearing assembly (5)	Remove	Use puller

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing:

KEY

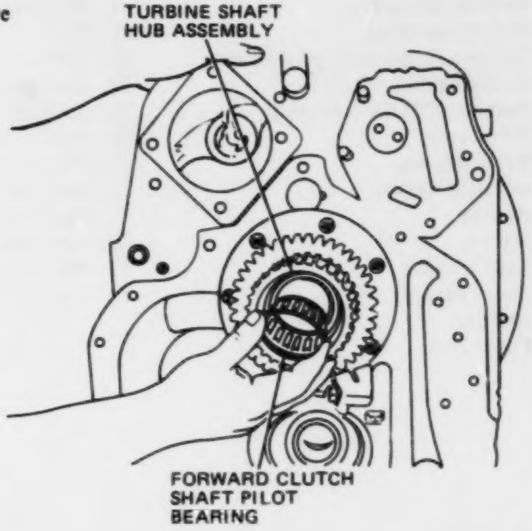
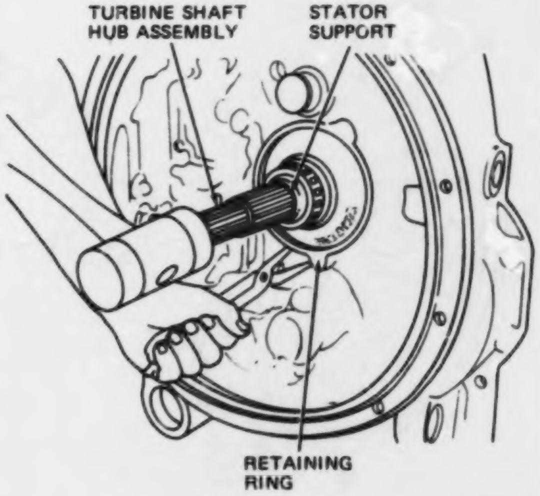
1. Lockplate
2. Screws
3. Bearing retainer plate
4. Reverse idler gear
5. Bearing assembly
6. Forward clutch shaft pilot bearing
7. Retaining ring
8. Turbine shaft hub assembly
9. Piston ring
10. Retaining ring
11. Locating washer
12. Bearing
13. Screws
14. Lock washers
15. Stator support
16. Bearing
17. Piston ring
18. Expander spring
19. Converter housing sleeve
20. Transmission temperature switch
21. Pipe plug
22. Stud
23. Stud
24. Idler gear shaft
25. Lockball
26. Reverse idler gear shaft
27. Pin
28. Pipe plug
29. Pipe plug
30. Pipe plug
31. Breather
32. Converter housing



TA246142

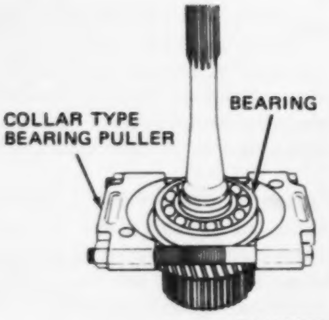
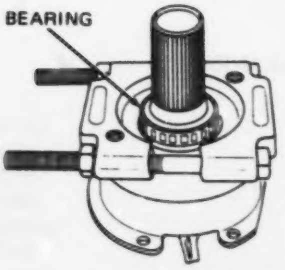
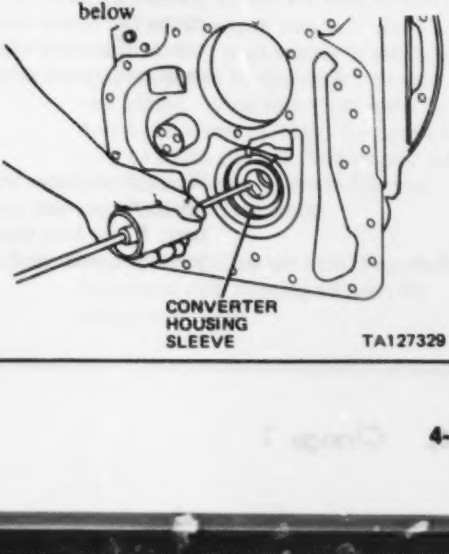
4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
1 (cont)		f. Forward clutch shaft pilot bearing (6)	Remove	 TURBINE SHAFT HUB ASSEMBLY FORWARD CLUTCH SHAFT PILOT BEARING TA127325
2	Converter housing front	a. Retaining ring (7) b. Turbine shaft hub assembly (8)	Spread ears Remove	Use spreader type ring pliers Hold retaining ring (7) ears open and tap assembly (8) from converter housing as shown  TURBINE SHAFT HUB ASSEMBLY STATOR SUPPORT RETAINING RING TA127326

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
3	Turbine shaft hub assembly	a. Piston ring (9) b. Retaining ring (10) c. Locating washer (11) d. Bearing (12)	Remove and discard Remove and discard Remove Remove	 TA127327
4	Converter housing rear	a. Six screws (13) and lock washers (14) b. Stator support (15)	Remove Remove	Tap at front and remove from converter housing at rear
5	Stator support	a. Bearing (16) b. Piston ring (17) c. Expander spring (18)	Remove Remove and discard Remove	 TA127328
6	Converter housing rear	a. Converter housing sleeve (19)	Remove	Use slide type hammer puller as shown below  TA127329

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
6 (cont)		b. Transmission temperature switch (20)	Remove	
		c. Plug (21)	Remove	
		d. Stud (22 and 23)	Remove	Remove only if damaged and replacement is required.

NOTE

Perform steps e, f and g only if parts are damaged and require replacement.

STEP	LOCATION	ITEM	ACTION	REMARKS
		e. Idler gear shaft (24) and lockball (25)	Remove	Tap at front and remove from rear
		f. Reverse idler gear shaft (26)	Remove	Pry from converter housing
		g. Pin (27)	Remove	
7	Converter housing	a. Pipe plug (28, 29, and 30)	Remove	
		b. Breather (31)	Remove	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				
8		All parts except bearings (4, 6, 12, and 16), converter housing (32) and switch (20)	Clean	Use cleaning solvent P-D-680. Immerse parts and move up and down slowly until all lubricant and foreign material is dissolved. Dry parts thoroughly after removal from cleaning solvent with moisture free compressed air or clean cloths
9		Bearings (4, 6, 12, and 16)	Clean	Use cleaning solvent P-D-680. Immerse bearings and slowly move up and down. Remove bearings from cleaning solvent and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning solvent and repeat above procedure until bearings are thoroughly clean. Dry bearings using moisture free compressed air. Be sure you direct air stream across bearing to avoid spinning. Don't spin bearing when drying them; bearings may be rotated slowly by hand to facilitate drying

WARNING

Exercise care when using alkali cleaners to avoid coming in contact with cleaner or breathing vapors to prevent skin rashes and bodily harm. Wear a rubber apron to prevent clothes from coming in contact with cleaner and use cleaner in a well ventilated area. If alkali cleaner is splashed on clothes or skin, flood area with large amounts of water and get immediate medical attention.

STEP	LOCATION	ITEM	ACTION	REMARKS
10		Converter housing (32)	Clean	Clean exterior and interior thoroughly with cleaning solvent P-D-680, or clean in hot solution tank with mild alkali solution. Part must remain in solution long enough to be thoroughly cleaned and heated. Rinse with clean water to remove all traces of alkali. Cast portions may be steam cleaned. Thoroughly dry immediately using moisture free compressed air or clean cloths
11		Transmission temperature switch (20)	Clean	Clean exterior of switch with clean cloth moistened with cleaning solvent; dry using clean cloth

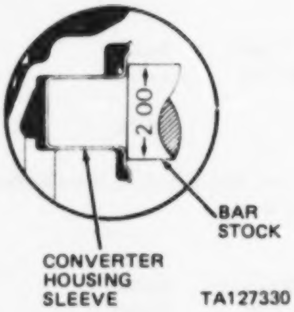
4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
12		Bearings	Inspect	Inspect for wear, chipping, or nicks. Don't replace a bearing cone or cup without replacing mating cup or cone at same time. After inspection dip bearings in clean, light oil and wrap in clean, lintless cloth or paper for protection until installed
13		Gears and shafts	Inspect	Inspect gear teeth for wear, pitting, chipping, nicks, cracks or scores; replace if these defects are noted. If gear teeth show spots where case hardening is worn through, or cracked, replace gear. Remove small nicks with suitable hone. Inspect shafts for bent, sprung, or twisted condition; replace if necessary. Inspect splines for wear or nicks; remove small nicks with a suitable hone
14		Metal sealing rings, retaining rings, locating rings, and piston rings	Replace	Use new parts
15		Studs	Inspect	Replace if bent, or if threads damaged
16		Converter housing	Inspect	Check that housing is thoroughly cleaned, and that mating surfaces and bearing bores are free from nicks or burrs. Clean up using a soft hone. Check for evidence of cracks; if cracks are observed, replace housing
17		Transmission temperture switch (20)	Inspect	Inspect body for damage and check for loose terminal; if any of these conditions are observed, replace switch
18		Remaining parts	Inspect	Inspect for wear, cracks, bent condition, or distortion. If any of these conditions are observed, replace the part
REASSEMBLY				
19	Converter housing	a. Breather (31) b. Pipe plug (28, 29, and 30)	Install Install	

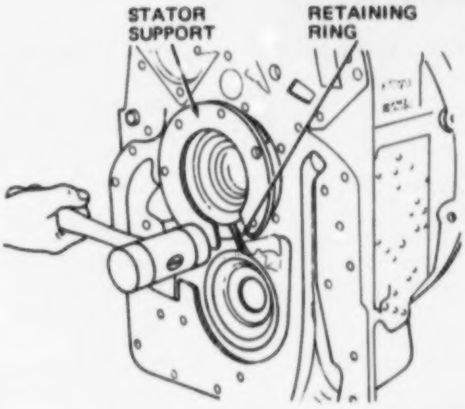
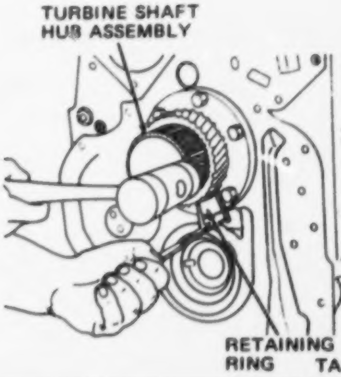
4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
20	Converter housing, rear	a. Pin (27) and reverse idler gear shaft (26)	Install	Tap in position with soft hammer
		b. Idler gear shaft (24) and lockball (25)	Install	Place lockball (25) in position on gear shaft (24), then, insert gear shaft through its hole in rear of housing and tap into position with soft hammer
		c. Stud (22 and 23)	Install	Apply loctite to threads
		d. Transmission temperture switch (20) and lock washer (33)	Install	
		e. Pipe plug (21)	Install	
		f. Converter housing sleeve (19)	Position	Position sleeve with tab aligned with cast slot in converter housing. Press sleeve into housing until it shoulders in housing as shown. Use two inches diameter bar stock
				
21	Stator support	a. Expander spring (18)	Install	Expander spring gap must be 180 degrees from piston ring hook joint
		b. Piston ring (17)	Install	
		NOTE In the following step, part number etched on bearing must be up.		
		c. Bearing (16)	Install	Press using suitable size sleeve
		d. Retaining ring (7)	Install	
22	Converter housing, rear	a. Stator support (15)	Position	Align holes in support with converter housing holes, then tap support into position as shown

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
22 (cont)				 TA127331
		b. Six screws (13) and lock washers (14)	Install	Tighten to 23-25 pounds foot torque
		NOTE In the following step, slot in bearing must be downward (opposite splined end of shaft).		
23	Turbine shaft hub assembly	a. Bearing (12) b. Locating washer (11) c. Retaining ring (10) d. Piston ring (9)	Install Install Install Install	Press using suitable size sleeve
24	Converter housing, rear	Turbine shaft hub assembly (8)	Position	While spreading ears on retaining ring (7) tap turbine shaft (8) into position. Be sure retaining ring (7) is fully engaged in slot of bearing (12)
		 TA127332		

4-4. TRANSMISSION MAINTENANCE (cont)

b. Converter Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
25	Reverse idler gear shaft	a. Bearing assembly (5)	Position	Place inner bearing, then bearing spacer on shaft
		b. Reverse idler gear (4)	Position	Place gear, long hub out, on shaft then install outer taper bearing (part of bearing assembly) in gear
		c. Bearing retainer plate (3)	Position	
		d. Lockplate (1)	Position	
		e. Three screws (2)	Install	Tighten screws to 37-41 pounds foot torque, then bend lockplate tabs over head of each screw
26	Transmission forward clutch shaft	Pilot bearing (6)	Position	
27	Converter housing	Torque converter group	Assemble	Para 4-4a

4-4. TRANSMISSION MAINTENANCE (cont)

c. *Transmission Rear Cover.*

This task covers: a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS
Pry Bars (2)
Hot Solution Tank with Mild Alkali Solution
Soft Hone
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

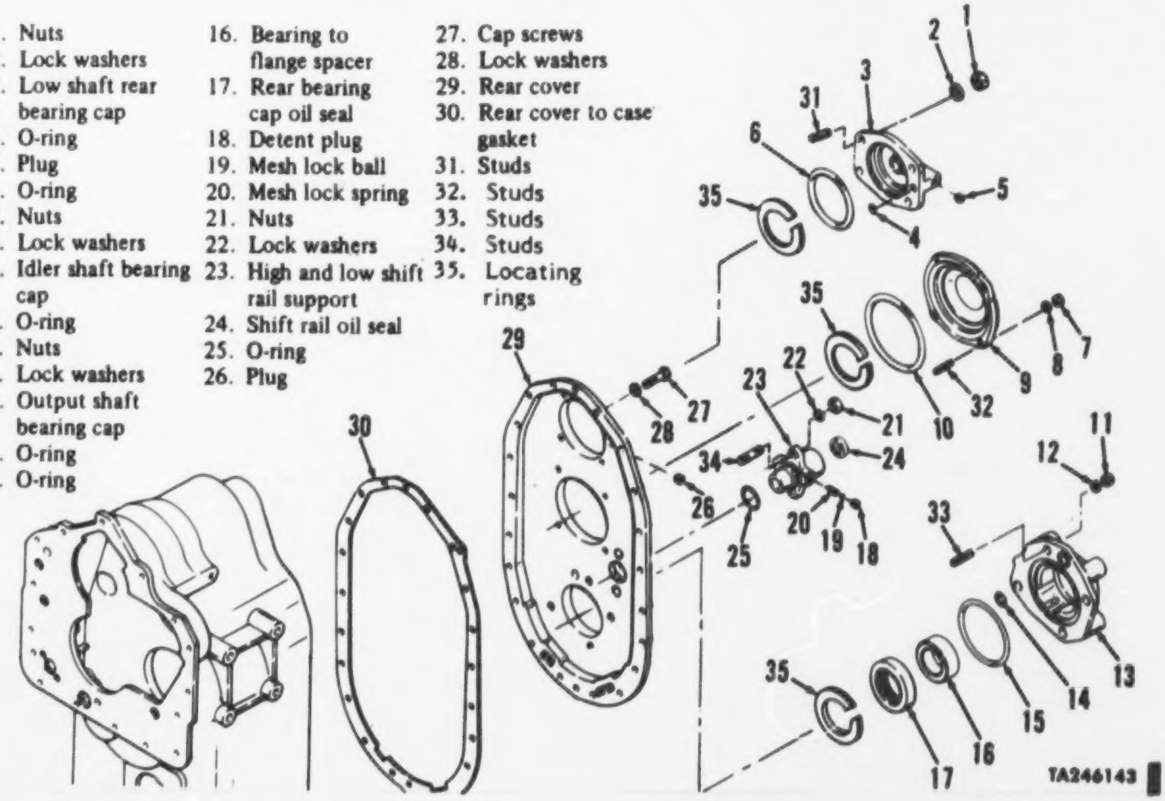
EQUIPMENT CONDITION

Paragraph	Condition Description
2-42b	Parking brake removed.
3-5d	Transmission separated from engine.

MATERIALS/PARTS
O-rings
Oil seals
Gasket
Clean cloths
Chassis grease
Permatex 2 NSN 8030-00-873-4792
Automatic transmission fluid (refer to current lubrication order)

KEY

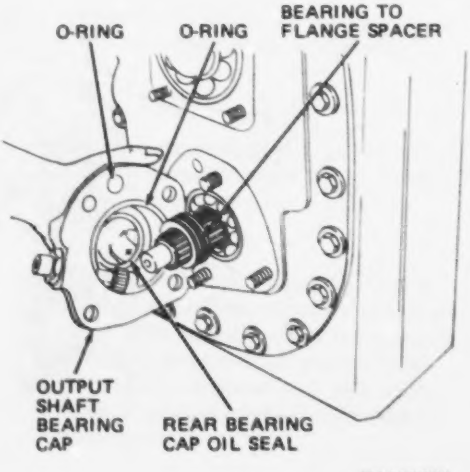
1. Nuts
2. Lock washers
3. Low shaft rear bearing cap
4. O-ring
5. Plug
6. O-ring
7. Nuts
8. Lock washers
9. Idler shaft bearing cap
10. O-ring
11. Nuts
12. Lock washers
13. Output shaft bearing cap
14. O-ring
15. O-ring
16. Bearing to flange spacer
17. Rear bearing cap oil seal
18. Detent plug
19. Mesh lock ball
20. Mesh lock spring
21. Nuts
22. Lock washers
23. High and low shift rail support
24. Shift rail oil seal
25. O-ring
26. Plug
27. Cap screws
28. Lock washers
29. Rear cover
30. Rear cover to case gasket
31. Studs
32. Studs
33. Studs
34. Studs
35. Locating rings



4-4. TRANSMISSION MAINTENANCE (cont)

c. Transmission Rear Cover (cont).

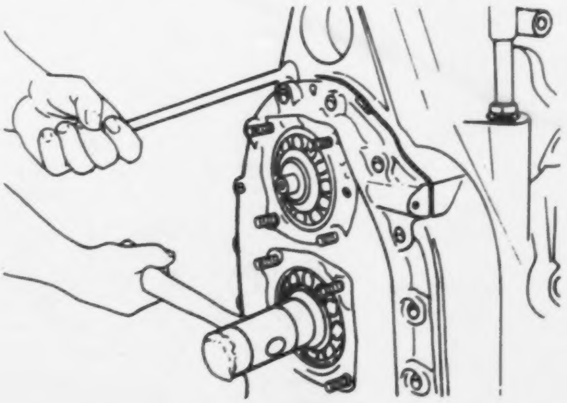
STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1		Four nuts (1)	Remove	If necessary, plug (5) may be removed
2		Four lock washers (2)	Remove	
3		Low shaft rear bearing cap (3)	Remove	
4		O-ring (4)	Remove and discard	
5		O-ring (6)	Remove and discard	
6		Four nuts (7)	Remove	
7		Four lock washers (8)	Remove	
8		Idler shaft bearing cap (9)	Remove	
9		O-ring (10)	Remove and discard	
10		Four nuts (11)	Remove	
11		Four lock washers (12)	Remove	
12		Output shaft bearing cap (13)	Remove	
13		O-ring (14)	Remove and discard	
14		O-ring (15)	Remove and discard	
15		Bearing to flange spacer (16)	Remove	
16		Rear bearing cap oil seal (17)	Remove and discard	
17		Detent plug (18), mesh lock ball (19), and mesh lock spring (20)	Remove	Remove only if necessary


O-RING
O-RING
BEARING TO FLANGE SPACER
OUTPUT SHAFT BEARING CAP
REAR BEARING CAP OIL SEAL

TA127334

4-4. TRANSMISSION MAINTENANCE (cont)

c. Transmission Rear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)				
18		Two nuts (21)	Remove	
19		Two lock washers (22)	Remove	
20		High and low shift rail support (23)	Remove	
21		Shift rail oil seal (24)	Remove and discard	
22		O-ring (25)	Remove and discard	
23		Plug (26)	Remove	Remove only if necessary
24		20 cap screws (27)	Remove	
25		20 lock washers (28)	Remove	
26		Three locating rings (35)	Remove	
27		Rear cover (29)	Remove	Use pry slots provided and pry rear cover from transmission housing. Use a soft hammer to tap on low clutch, idler, and output shafts to prevent rear cover from binding
		 TA127335		
28		Rear cover to case gasket (30)	Remove and discard	Clean all traces of gasket from transmission case

4-4. TRANSMISSION MAINTENANCE (cont)

c. Transmission Rear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Exercise care when using alkali cleaners to avoid coming in contact with cleaner or breathing vapors to prevent skin rashes and bodily harm. Wear a rubber apron to prevent clothes from coming in contact with cleaner and use cleaner in a well ventilated area. If alkali cleaner is splashed on clothes or skin, flood area with large amounts of water and get immediate medical attention.

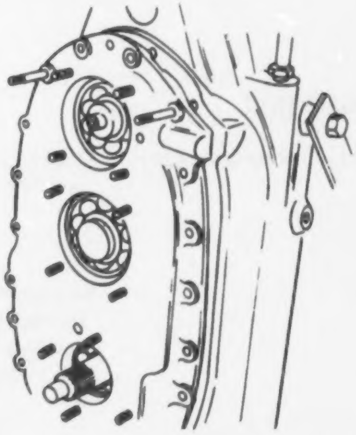
WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
29		All parts	Clean	Clean interior and exterior of parts in hot solution tank with a mild alkali solution. Allow parts to remain in solution long enough to be cleaned and heated. Thoroughly rinse parts with clean water to remove all traces of alkali. Dry parts thoroughly immediately using moisture free compressed air or clean cloths
INSPECTION				
30	Rear cover (29)	Studs (31, 32, 33, and 34)	Inspect	Check for damaged threads and bent condition. Repair damaged threads by chasing with proper size die; replace bent studs
31		Rear cover (29), bearing caps (3, 9, and 13), and high and low shift rail support (23)	Inspect	Check that all traces of gasket (30) is removed from mating surface of rear cover. Check that mating surfaces and bores are free from nicks or burrs and cracks are not evident. Remove burrs with a soft hone; if nicks or cracks are observed, replace part
32		Bearing to flange spacer (16)	Inspect	Replace if surfaces worn or deformed
33		Mesh lock ball (19)	Inspect	Replace if deformed or damaged

4-4. TRANSMISSION MAINTENANCE (cont)

c. Transmission Rear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
34		Mesh lock spring (20)	Inspect	Replace if cracked, broken, deformed or permanently set
INSTALLATION				
35	Transmission housing, rear	a. Rear cover to case gasket (30)	Position	Install two aligning studs in transmission housing to facilitate positioning of gasket and installation of rear cover (29). Apply thin coat of GAA to hold gasket in place.
NOTE Before performing next step, move forward range shift hub on output shaft (see below). Pulling on high and low shift rail may cause hub to fall off.				
		b. Rear cover (29)	Position	Tap rear cover in place aligning shaft bearings with bearing bores in cover  TA127336
		c. 20 lock washers (28) and cap screws (27)	Install	Remove two aligning studs after several lock washers and cap screws are installed; tighten cap screws to 37-41 pounds foot torque
		d. Locating rings (35)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

c. Transmission Rear Cover (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
36	High and low shift rail support (23)	a. shift rail oil seal (24)	Install and lubricate	Apply thin coat of Permatex 2 on outer diameter of oil seal then press into support with lip of oil seal toward rear cover. Lubricate oil seal with OE10 (refer to current lubrication order)
		b. O-ring (25)	Lubricate and install	Lubricate with GAA (refer to current lubrication order); position on shift rail support (23)
37	Rear Cover (29)	a. Mesh lock spring (20)	Install	Apply GAA grease to mesh lock spring and ball (19) before installing
		b. Mesh lock ball (19)	Install	
		c. High and low shift rail support (23)	Install	Place small diameter long screw through high and low shift rail support (23) to hold ball (19) in depressed position, against spring (20). Place high and low shift rail support (23) on high and low shift rail with screw upward, until flat of shift rail catches ball (19). Then remove small diameter long screw from support (23). Push high and low shift rail support (23) while also turning it, until support is against rear cover (29)
		d. Two lock washers (22) and nuts (21)	Install	Tighten to 41-45 pounds foot torque
		e. Detent plug (18)	Install	
38	Output shaft bearing cap (13)	a. Rear bearing cap oil seal (17)	Install and lubricate	Apply thin coat of Permatex 2 on outer diameter of oil seal then press into bearing cap with lip of seal toward bearing side of cap. Lubricate oil seal with OE10 (refer to current lubrication order)
		b. O-rings (14 and 15)	Lubricate and position	Lubricate with OE10 (refer to current lubrication order); position on bearing cap (13)
39	Rear cover (29)	a. Bearing to flange spacer (16)	Position	On output shaft
		b. Output shaft bearing cap (13)	Position	

4-4. TRANSMISSION MAINTENANCE (cont)

c. *Transmission Rear Cover (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)				
		c. Four lock washers (12) and nuts (11)	Install	Tighten to 91-100 pounds foot torque
40	Idler shaft bearing cap (9)	O-ring (10)	Lubricate and position	Lubricate with OE10 (refer to current lubrication order) position on bearing cap (9)
41	Rear cover (29)	a. Idler shaft bearing cap (9)	Position	
		b. Four lock washers (8) and nuts (7)	Install	Tighten to 41-45 pounds foot torque
42	Low shaft rear bearing cap (3)	a. Plug (5)	Install	
		b. O-rings (4 and 6)	Lubricate and position	Lubricate with OE10 (refer to current lubrication order); position on bearing cap (3)
43	Rear cover (29)	a. Low shaft rear bearing cap (3)	Position	
		b. Four lock washers (2) and nuts (1)	Install	Tighten to 41-45 pounds foot torque
		c. Plug (26)	Install	
		d. Parking brake	Install	Para 2-42b

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS

Mechanical Puller	NSN 5120-00-423-1596
Impact Wrench	NSN 5130-00-596-9821
Soft Hone	
Soft Bar, 18 inches long, 2 inches outside diameter	
Arbor press, 1/2 ton capacity	
Snap Ring Pliers, Contracting Type	NSN 5120-00-293-0046
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

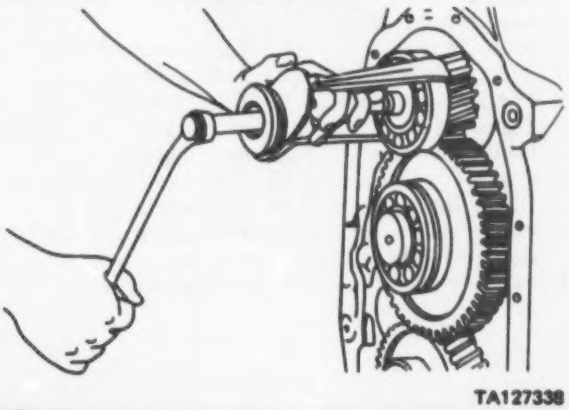
MATERIALS/PARTS

Clean cloths	
Permatex 2	NSN 8030-00-873-4792
OE10 (refer to current lubrication order)	
Cleaning solvent P-D-680	
Light oil	
Retaining rings	
O-rings	
Piston rings	
Locating rings	
Oil seals	
Flange nut	

EQUIPMENT CONDITION

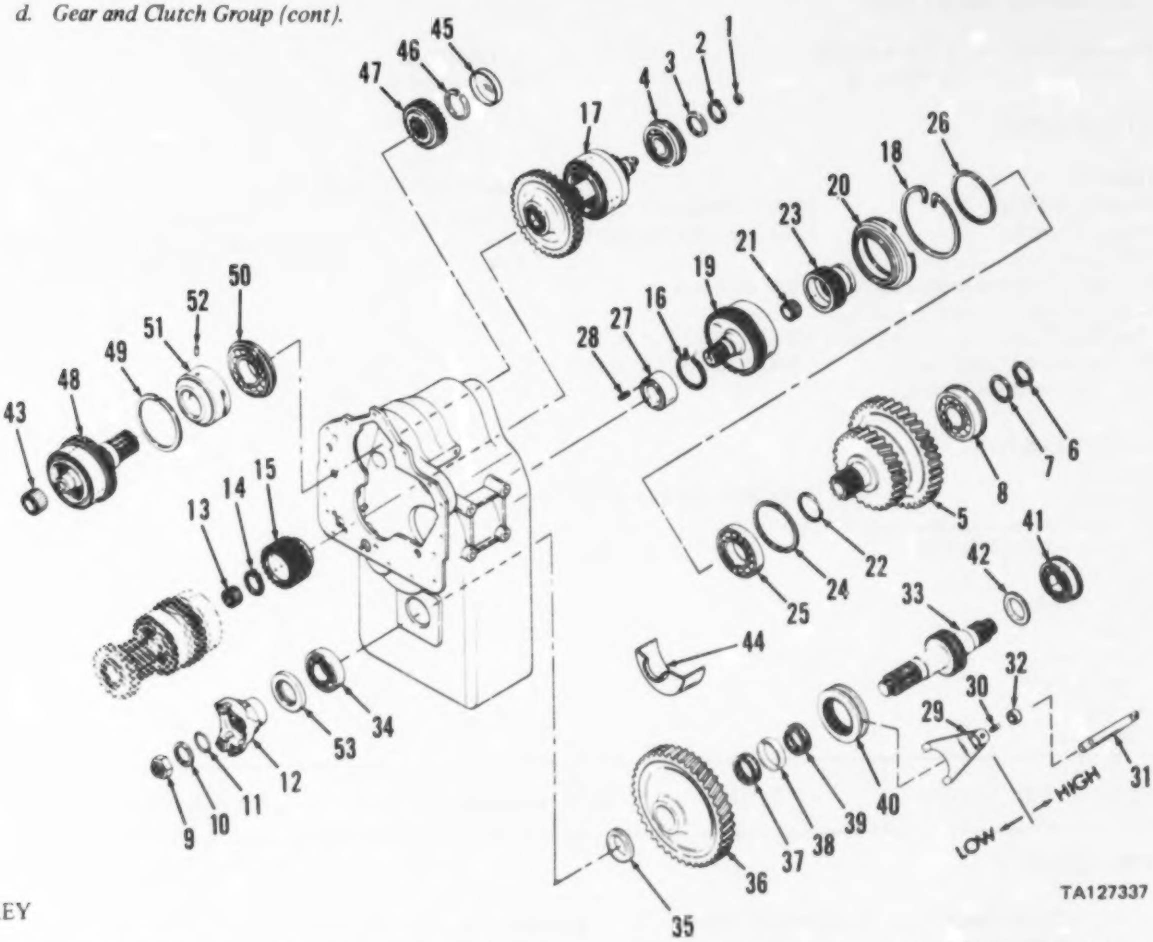
Paragraph	Condition Description
4-4a	Torque converter group disassembled.
4-4c	Transmission rear cover removed.

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Transmission housing, rear	a. Low shaft piston ring (1)	Remove	
		b. Retaining ring (2)	Remove and discard	
		c. Support washer (3)	Remove	
		d. Low speed shaft rear bearing (4)	Remove	Use puller as shown



4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

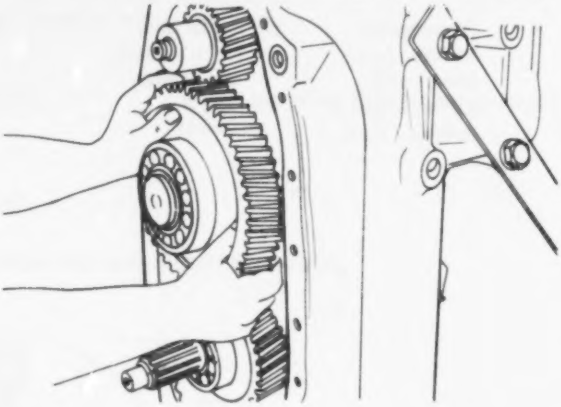
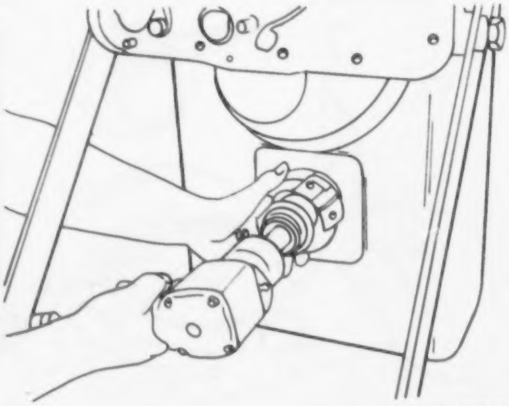


KEY

1. Low shaft piston ring
2. Retaining ring
3. Support washer
4. Low speed shaft rear bearing
5. Idler shaft and gear
6. Retaining ring
7. Support washer
8. Idler shaft rear bearing
9. Flange nut
10. Flange washer
11. O-ring
12. Output flange
13. Reverse and second clutch rear bearing
14. Retaining ring
15. Second clutch disc hub
16. Third clutch front bearing locating ring
17. Low clutch assembly
18. Bearing carrier locating ring
19. Third clutch assembly
20. Bearing carrier
21. Third clutch shaft pilot bearing
22. Retaining ring
23. Third clutch disc hub
24. Retaining ring
25. Third clutch disc hub bearing
26. Locating ring
27. Piston ring outer race
28. Roll pin
29. High and low shift fork
30. Lock screw
31. High and low shift rail
32. Spacer
33. Output shaft
34. Output shaft front bearing
35. Thrust washer
36. Low range gear
37. Low gear bearing
38. Bearing spacer
39. Low gear bearing
40. Range shift hub
41. Output shaft rear bearing
42. Gear thrust washer
43. Forward shaft pilot bearing
44. Oil baffle
45. Bore plug
46. Retaining ring
47. Forward shaft gear
48. Forward clutch assembly
49. Retaining ring
50. Forward shaft rear bearing
51. Piston ring sleeve
52. Roll pin
53. Output shaft oil seal

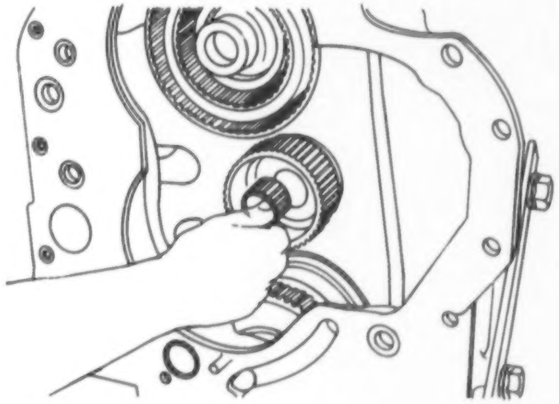
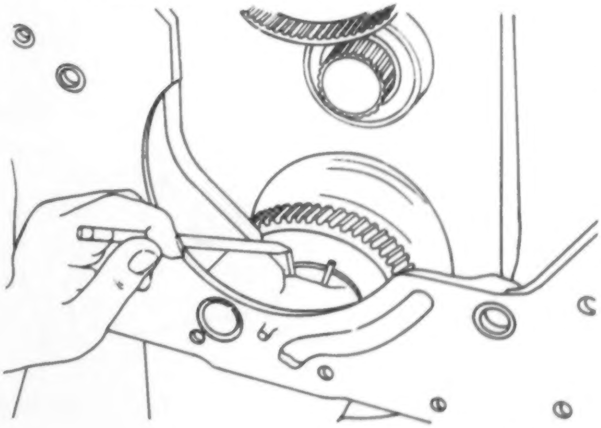
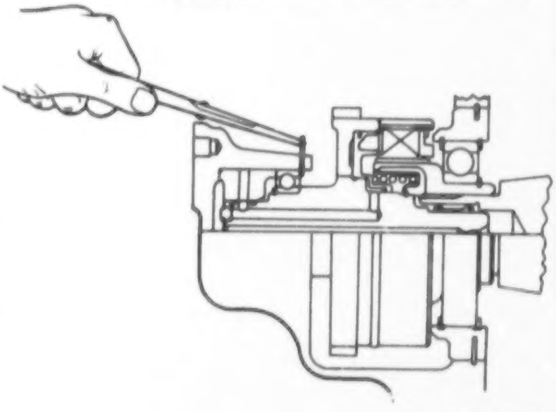
4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
1 (cont)		e. Idler shaft and gear (5)	Remove	Remove idler shaft and gear and associated parts (6 through 8) as an assembly  TA127339
2	Idler shaft and gear (5)	a. Retaining ring (6)	Remove and discard	
		b. Support washer (7)	Remove	
		c. Idler shaft rear bearing (8)	Remove	Use puller
3	Transmission housing, front, output shaft	a. Flange nut (9)	Remove	Use impact wrench; if unavailable, use a bar to hold output flange (12)
		b. Flange washer (10)	Remove	
		c. O-ring (11)	Remove and discard	 TA127340

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
3 (cont)		d. Output flange (12)	Remove	Use puller
4	Transmission housing, front, reverse and second clutch assembly bore	a. Reverse and second clutch rear bearing (13)	Remove	 TA127341
		b. Retaining ring (14)	Remove and discard	
		c. Second clutch disc hub (15)	Remove	
5	Transmission housing, front, third clutch	Third clutch front bearing locating ring (16)	Compress and detach	Compress protruding ends of locating ring and remove ring from ring groove. Don't remove ring from third clutch assembly
	 TA127342			 TA127343

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

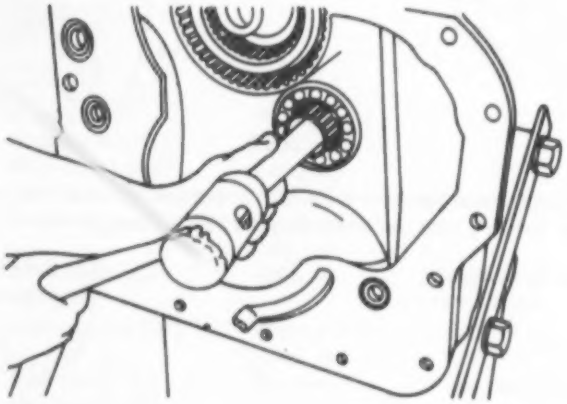
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
6	Transmission housing, front	Low clutch assembly (17)	Remove	Use soft bar to tap from housing. Remove from rear

CAUTION

In following step, have an assistant hold low clutch assembly on opposite side of housing to prevent assembly from dropping out of housing.

NOTE

Refer to paragraph 4-4g to disassemble low clutch assembly.



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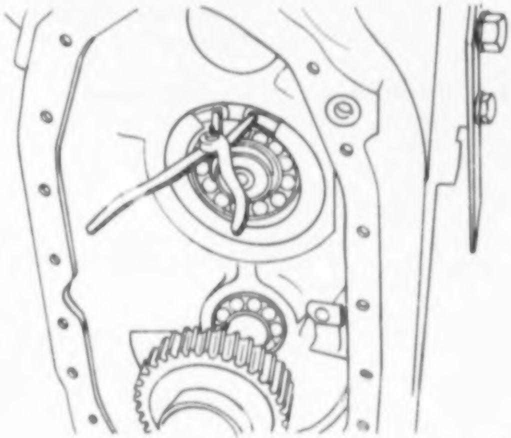
4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
7	Transmission housing, rear	Bearing carrier locating ring (18)	Contract and hold	Use contracting type snap ring pliers; lock in position shown

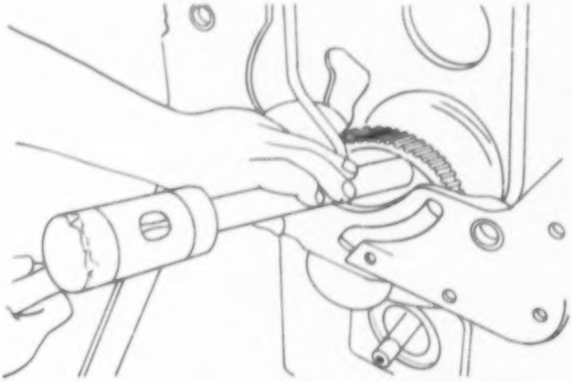


TA127345

NOTE

If third clutch assembly is difficult to remove, recheck front and rear locating rings to be sure they are clear of ring groove.

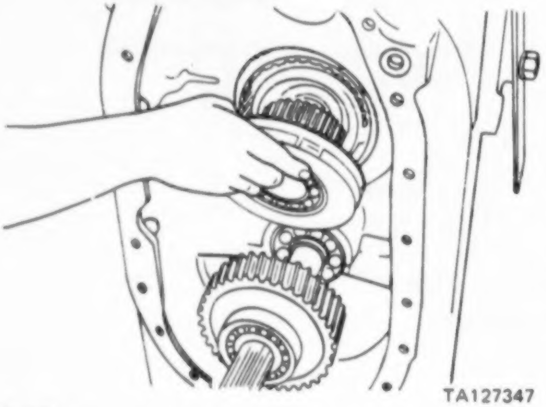
STEP	LOCATION	ITEM	ACTION	REMARKS
8	Transmission housing, front	a. Third clutch assembly (19)	Tap	Use soft bar to tap third clutch assembly from housing



TA127346

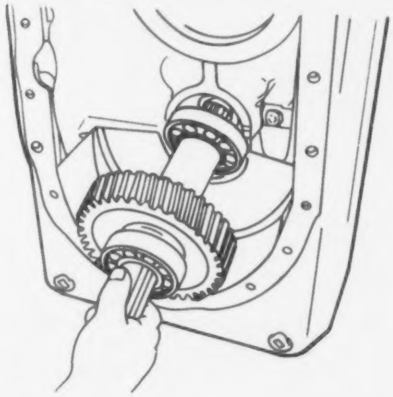
4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
8 (cont)		b. Bearing carrier (20)	Remove	Locating ring, bearing carrier, and associated parts (21 through 26) are removed as an assembly TA127347
9	Bearing carrier (20)	a. Bearing carrier locating ring (18)	Remove and discard	
		b. Third clutch shaft pilot bearing (21)	Remove	
		c. Retaining ring (22)	Remove and discard	
		d. Third clutch disc hub (23)	Remove	Use sleeve to remove
		e. Retaining ring (24)	Remove and discard	
		f. Third clutch disc hub bearing (25)	Remove	Use sleeve to remove
		g. Locating ring (26)	Remove and discard	
10	Transmission housing, rear	a. Third clutch assembly (19)	Remove	
		NOTE Refer to paragraph 4-4h to repair third clutch assembly		
		b. Piston ring outer race (27)	Remove	
		c. Roll pin (28)	Remove	
		d. High and low shift fork (29)	Remove	Remove high and low shift fork and associated parts (30 through 32) as an assembly; disengage from range shift hub (40)

4-4. TRANSMISSION MAINTENANCE (cont)

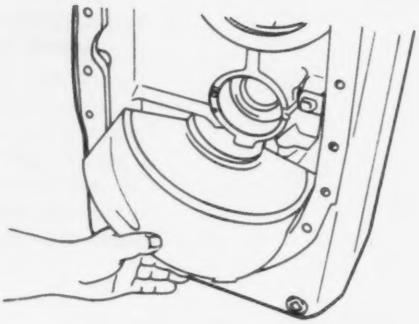
d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
11	High and low shift fork (29)	a. Lock screw (30)	Remove	
		b. High and low shift rail (31)	Remove	
		c. Spacer (32)	Remove	
12	Transmission housing, rear	Output shaft (33)	Remove	Remove output shaft and associated parts (34 through 42) as an assembly  TA127348
13	Output shaft (33)	a. Output shaft front bearing (34)	Remove	Use puller
		b. Thrust washer (35)	Remove	
		c. Low range gear (36)	Remove	Use puller
		d. Low gear bearing (37)	Remove	If bearings (37 and 39) and spacer (38) remain in gear, use sleeve to remove
		e. Bearing spacer (38)	Remove	
		f. Low gear bearing (39)	Remove	
		g. Range shift hub (40)	Remove	
		h. Output shaft rear bearing (41)	Remove	Use puller
		i. Gear thrust washer (42)	Remove	
14	Transmission housing, front	Forward shaft pilot bearing (43)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
15	Transmission housing, rear	a. Oil baffle (44)	Remove	



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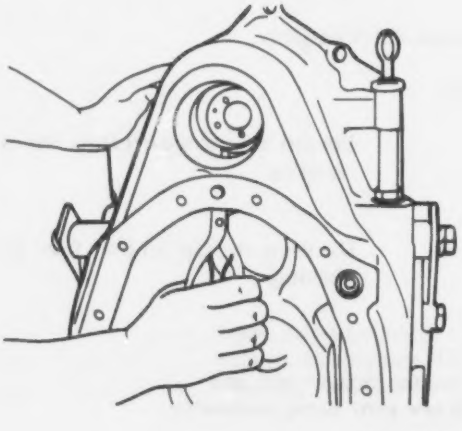
CAUTION

In following step, take care not to damage bore in housing.

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Bore plug (45)	Remove	Carefully pry out
		c. Retaining ring (46)	Remove and discard	



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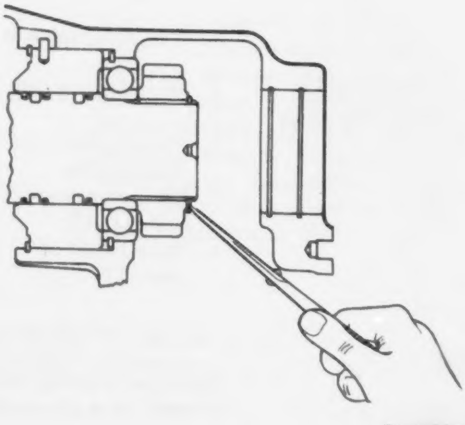

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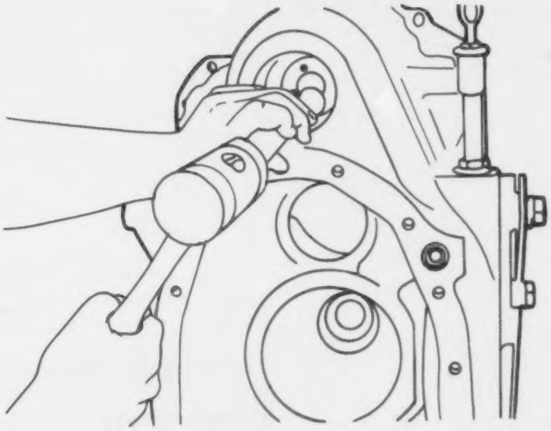
4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
15 (cont)		d. Forward shaft gear (47)	Remove	
		e. Forward clutch assembly (48)	Remove	Tap from housing using soft bar and remove from front of housing



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NOTE

Refer to paragraph 4-4i for repair of forward clutch assembly.

STEP	LOCATION	ITEM	ACTION	REMARKS
16	Transmission housing, front	a. Retaining ring (49)	Remove and discard	
		b. Forward shaft rear bearing (50)	Remove	Use soft bar and tap out from rear of housing
		c. Piston ring sleeve (51)	Remove	
		d. Roll pin (52)	Remove	
		e. Output shaft oil seal (53)	Remove and discard	Use sleeve and tap out from front of housing

NOTE

Discard all retaining rings, piston rings, locating rings, O-rings, and oil seals; these parts will be replaced with new parts during reassembly.

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
17		Bearings (4, 8, 13, 21, 25, 34, 37, 39, 41, 43, and 50)	Clean	Use cleaning solvent P-D-680. Immerse bearings in cleaning solvent and move slowly up and down. Remove bearings. Strike larger side of cone against block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning solvent. Repeat process until bearings are thoroughly clean. Dry using moisture-free compressed air. Direct air stream across bearing. Do not spin bearings when drying. Rotate bearings slowly by hand to facilitate drying

NOTE

If low clutch assembly (17), third clutch assembly (19), and forward clutch assembly (48) have been repaired don't perform following step.

CAUTION

Don't immerse low clutch assembly (17), third clutch assembly (19), and forward clutch assembly (48) in cleaning solvent.

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
18		Low clutch assembly (17), third clutch assembly (19), and forward clutch assembly (48)	Clean	Use clean cloths moistened with cleaning solvent P-D-680 to remove exterior oil and/or dirt, then dry with clean cloths
19		All other parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry thoroughly using moisture-free compressed air or clean cloths
20		Bearings (4, 8, 13, 21, 25, 34, 37, 39, 41, 43 and 50)	Inspect	Inspect all rollers, cages and cups for wear, chips, nicks, cracks, damage, and distortion. If any of these conditions are observed, replace bearing. After inspecttion, immerse in clean light oil and wrap in clean lintless cloth or paper
21		Idler shaft and gear (5), low range gear (36), forward shaft gear (47)	Inspect	Inspect teeth on gears for wear, pits, nicks, cracks and scores. Remove small nicks with hone. Inspect overall for damage, distortion, and cracks. If any of these conditions observed, replace gear
22		Output shaft (33)	Inspect	Check for bent condition. Check that splines are not twisted or chipped. If shaft is worn or any of the above conditions observed, replace it
23		Output flange (12), and range shift hub (40)	Inspect	Check for bent or worn condition. Check that internal splines are not bent or chipped; if any of the above conditions observed, replace part
24		All other parts	Inspect	Inspect for wear, cracks, distortion, pits, nicks, scores and damage. If any of these conditions observed, replace part
REASSEMBLY				
25	Transmission housing, front, forward clutch bore	a. Output shaft oil seal (53)	Lubricate and install	Lubricate with OE10 (refer to current lubrication order); then apply thin coat of Permatex 2 on outer diameter of oil seal. Install oil seal using sleeve. Oil seal is properly installed when seal is flush with front of housing

4-4. TRANSMISSION MAINTENANCE (cont)

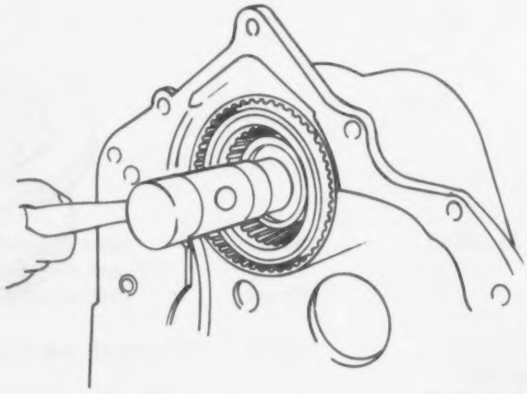
d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
25 (cont)		b. Forward shaft rear bearing (50)	Tap in	Bearing snap ring groove faces front of housing
		c. Roll pin (52)	Install	In sleeve (51)
		d. Piston ring sleeve (51)	Position	Align pin (52) in sleeve with groove in housing, then tap sleeve into position
		e. Retaining ring (49)	Install	

CAUTION

In following step, don't damage forward shaft piston rings.

STEP	LOCATION	ITEM	ACTION	REMARKS
		f. Forward clutch assembly (48)	Position and install	Use soft hammer and tap into position



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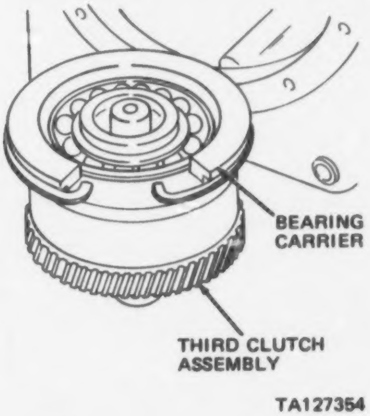
STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Forward shaft pilot bearing (43)	Install	
26	Transmission housing, rear, forward clutch bore	a. Forward shaft gear (47)	Position	
		b. Retaining ring (46)	Install	Use retaining ring pliers
		c. Bore plug (45)	Install	Tap into position until flush with outside of housing
27	Bearing carrier (20)	a. Locating ring (26)	Install	In bearing carrier
		b. Third clutch disc hub bearing (25)	Install	Press into bearing carrier against locating ring (26)
		c. Retaining ring (24)	Install	Secures bearing (25)
		d. Third clutch disc hub (23)	Install	Press into bearing (25)
		e. Retaining ring (22)	Install	Secures disc hub (23)

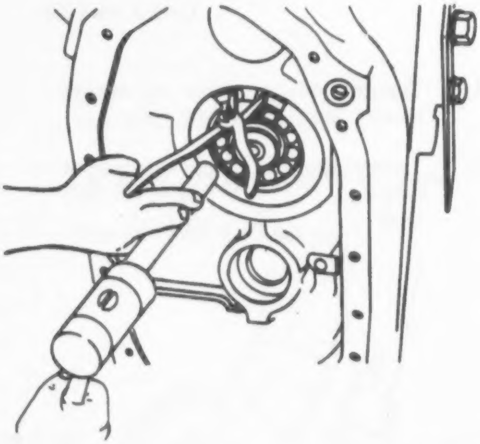
4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
27 (cont)		f. Bearing carrier locating ring (18)	Install	In bearing carrier (20)
		g. Third clutch shaft pilot bearing (21)	Install	
			CAUTION Don't force operation in next step.	
28	Third clutch assembly (19)	a. Bearing carrier (20)	Position	Align disc hub (23) splines with internal teeth of disc in third clutch assembly (19). Disc hub splines must be in full position with internal teeth of all discs 
		b. Third clutch front bearing locating ring (16)	Position	On clutch assembly (19)
		c. Outer race roll pin (28)	Install	In outer race (27)
		d. Piston ring outer race (27)	Install	
		e. Bearing carrier locating ring (18)	Contract	Use contracting type snap ring pliers. Lock pliers to hold ring in position

4-4. TRANSMISSION MAINTENANCE (cont)

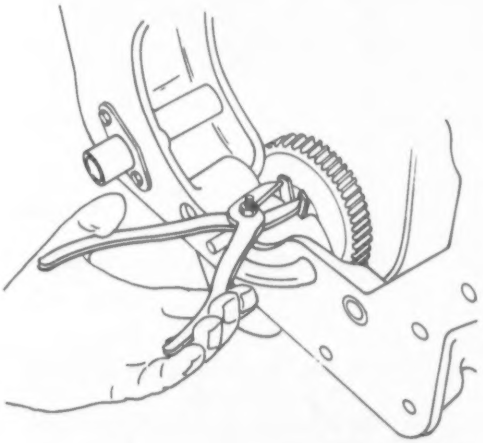
d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
29	Transmission housing, rear	a. Third clutch assembly (19) and bearing carrier (20)	Position and tap in	Tap assembly into housing until ring groove in housing is aligned with locating ring (18). Remove pliers  TA127355
		b. Bearing carrier locating ring (18)	Check	Ring in full position in ring groove
		c. Oil baffle (44)	Install.	
30	Low range gear (36)	a. Low gear bearing (37)	Install	Use soft hammer to install until flush with gear (36) hub
		b. Bearing spacer (38)	Install	Use soft hammer to install until flush with bearing (37)
		c. Low gear bearing (39)	Install	Use soft hammer to install until flush with gear (36) hub
31	Output shaft (33)	a. Range shift hub (40)	Install	On output shaft (33)
		b. Gear thrust washer (42)	Install	Bevel towards rear cover
		c. Output shaft rear bearing (41)	Install	Press onto output shaft until bearing shoulders on washer (42)
		d. Low range gear (36)	Install	Press onto output shaft
		e. Thrust washer (35)	Install	
		f. Output shaft front bearing (34)	Install	Press onto output shaft until bearing shoulders on thrust washer (35)
32	Transmission housing, rear	Output shaft (33)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
33	High and low shift fork (29)	a. Spacer (32) b. High and low shift rail (31) c. Lock screw (30)	Install Install Install	On high and low shift rail (31) In high and low shift fork (29) Secures spacer (32) and high and low shift rail (31) to high and low shift fork (29)
34	Transmission housing, rear	High and low shift fork (29)	Install	Engage forks in range shift hub (40) race
35	Transmission housing, front	Third clutch front bearing locating ring (16)	Install	Into ring groove



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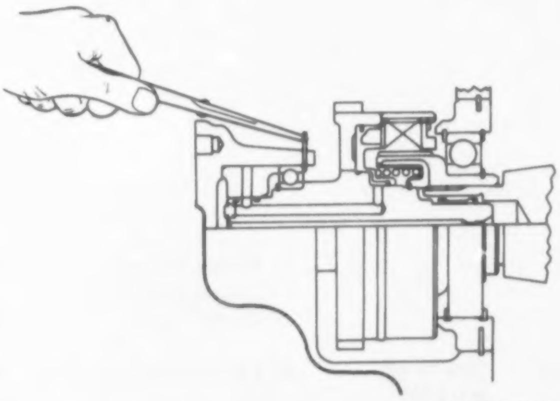

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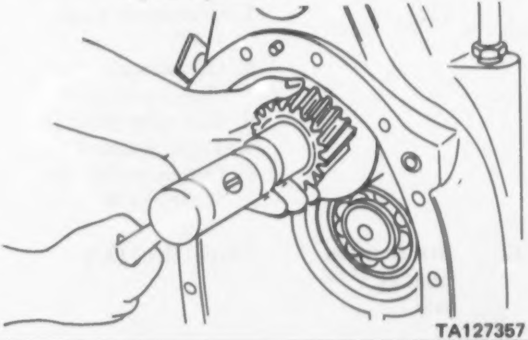
NOTE

Be certain locating ring (16) is in full position in ring groove.

STEP	LOCATION	ITEM	ACTION	REMARKS
36	Transmission housing, rear, low clutch bore	Low clutch assembly (17)	Install	Tap into position



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4-4. TRANSMISSION MAINTENANCE (cont)

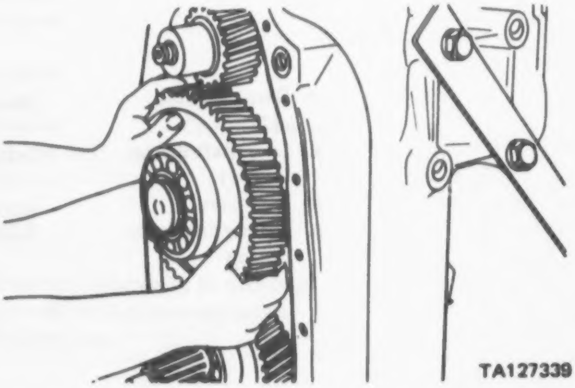
d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
37	Transmission housing, front	a. Second clutch disc hub (15)	Install	On low clutch shaft
		b. Retaining ring (14)	Install	
		c. Reverse and second clutch rear bearing (13)	Install	
		d. Output flange (12)	Install	
		e. O-ring (11)	Install	Lubricate with OE10 (Refer to current lubrication order)
		f. Flange washer (10)	Install	
		g. New flange nut (9)	Install	Tighten to 200-250 pounds foot torque
38	Idler shaft and gear (5)	a. Idler shaft rear bearing (8)	Install	Press into idler shaft and gear
		b. Support washer (7)	Install	
		c. Retaining ring (6)	Install	

NOTE

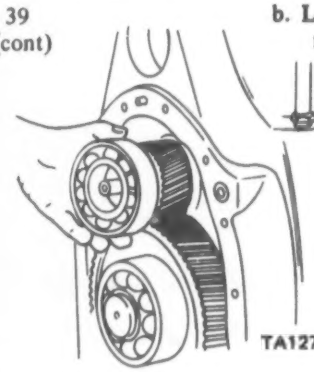
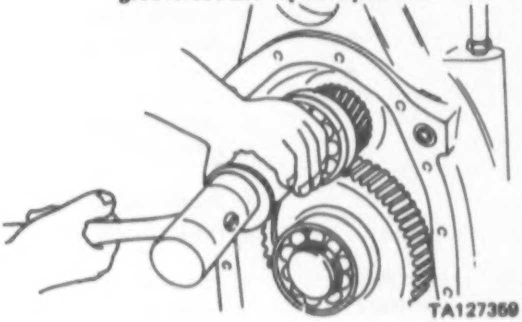
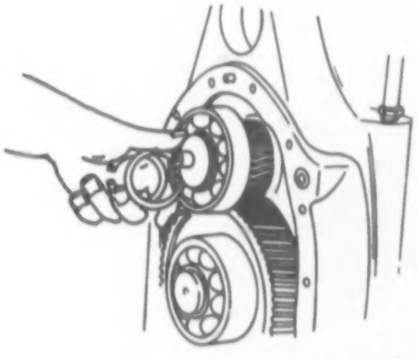
In the following step carefully align splines of idler shaft and gear (5) with splines of third clutch assembly.

39	Transmission housing, rear	a. Idler shaft and gear (5)	Install	In end of third clutch assembly



4-4. TRANSMISSION MAINTENANCE (cont)

d. Gear and Clutch Group (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
39 (cont)	 TA127358	b. Low speed shaft rear bearing (4)	Install	Position on low clutch shaft with ring groove out and tap into position  TA127359
		c. Bearing support washer (3)	Install	 TA127360
		d. Retaining ring (2)	Install	Secures low speed shaft rear bearing (4)
		e. Low shaft piston ring (1)	Install	On low clutch shaft
		f. Rear cover	Install	Para 4-4c
		g. Torque converter group	Reassemble	Para 4-4a

4-4. TRANSMISSION MAINTENANCE (cont)

e. Transmission Housing.

This task covers:		
	a. Disassembly	c. Inspection
	b. Cleaning	d. Reassembly

INITIAL SETUP

TOOLS

Tool	Reference
Expander Tool	FSCM 12603 p/n CE805
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4d	Gear and clutch group disassembled.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
OE10 (refer to current lubrication order)
O-rings

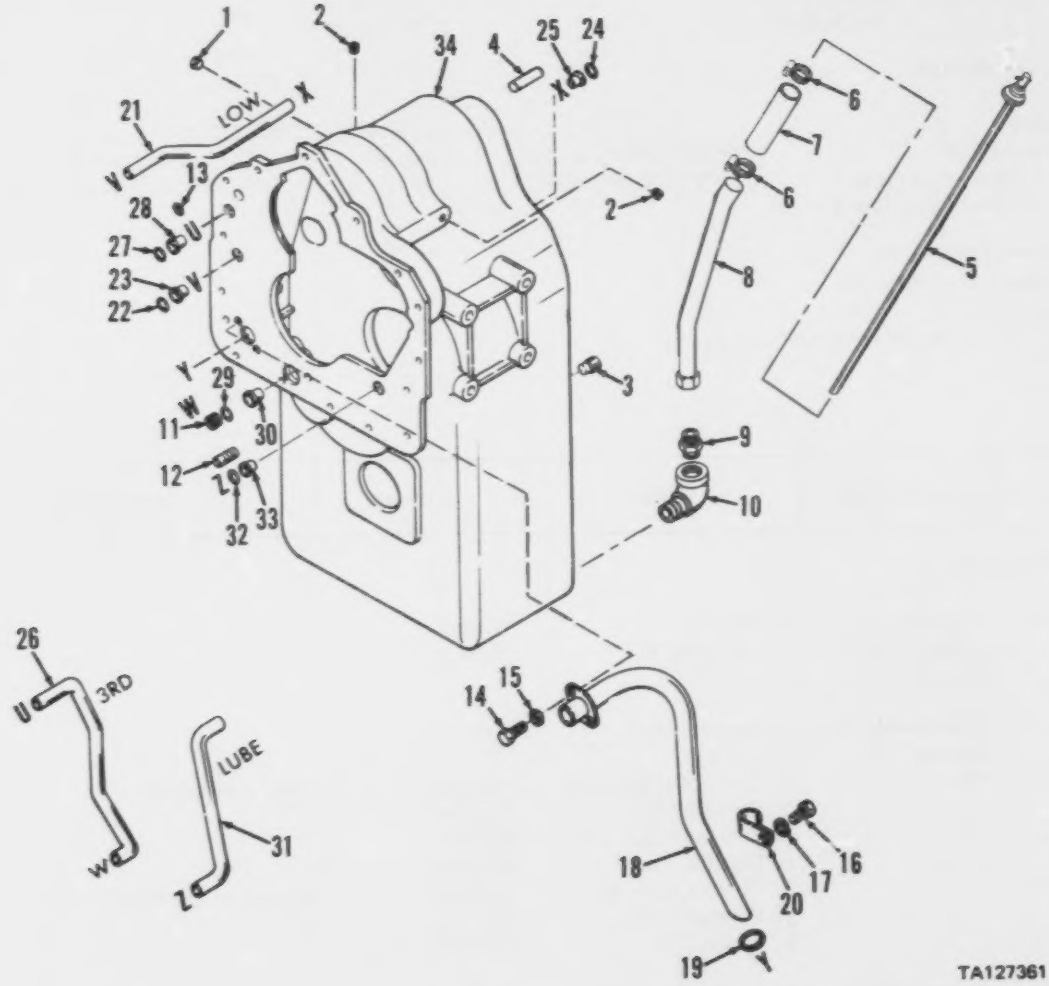
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Transmission housing (34), left side	a. Plug (1)	Remove	
		b. Two plugs (2)	Remove	
2	Transmission housing (34), rear	a. Magnetic drain plug (3)	Remove	
		b. Two dowel pins (4)	Remove	Only if damaged
		c. Dipstick (5)	Remove	
		d. Two hose clamps (6)	Remove	
		e. Dipstick hose (7)	Remove	
		f. Dipstick tube (8)	Remove	Loosen nut on dipstick tube
		g. Connector (9)	Remove	
		h. Elbow (10)	Remove	
3	Transmission housing (34), front	a. Third speed pressure plug (11)	Remove	
		b. Stud (12)	Remove	Only if damaged
		c. O-ring (13)	Remove and discard	

NOTE

Disassembly of tubes is a repair function which may be necessary after inspection. Tubes and sleeves will not be removed unless inspection reveals a damaged or leaking part.

4-4. TRANSMISSION MAINTENANCE (cont)

e. Transmission Housing (cont).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TA127361

KEY

1. Plug
2. Plugs
3. Magnetic drain plug
4. Dowel pins
5. Dipstick
6. Hose clamps
7. Dipstick hose
8. Dipstick tube
9. Connector
10. Elbow
11. Third speed pressure plug
12. Stud
13. O-ring
14. Cap screws
15. Lock washers
16. Cap screw
17. Lock washer
18. Suction tube assembly
19. O-ring
20. Suction tube clip
21. Low speed clutch pressure tube
22. O-ring
23. Tube sleeve
24. O-ring
25. Tube sleeve
26. Third speed tube
27. O-ring
28. Tube sleeve
29. O-ring
30. Tube sleeve
31. Lubrication clutch tube
32. O-ring
33. Tube sleeve
34. Transmission housing

4-4. TRANSMISSION MAINTENANCE (cont)

e. *Transmission Housing (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
4	Transmission housing (34)	a. Two cap screws (14)	Remove	
		b. Two lock washers (15)	Remove	
		c. Cap screw (16)	Remove	
		d. Lock washer (17)	Remove	
		e. Suction tube assembly (18)	Withdraw	From transmission housing
		f. O-ring (19)	Remove and discard	
		g. Suction tube clip (20)	Remove	

NOTE

To drill out tube ends, use drill bit with same diameter of tubes at sleeves.

STEP	LOCATION	ITEM	ACTION	REMARKS
		h. Low speed clutch pressure tube (21)	Remove and discard	Drill out tube ends at points V and X
		i. O-rings (22 and 24)	Remove and discard	
		j. Tube sleeves (23 and 25)	Remove and discard	
		k. Third speed tube (26)	Remove	Drill out tube ends at points U and W
		l. O-rings (27 and 29)	Remove and discard	
		m. Tube sleeves (28 and 30)	Remove and discard	
		n. Lubrication clutch tube (31)	Remove	Drill out tube end at point Z
		o. O-ring (32)	Remove and discard	
		p. Tube sleeve (33)	Remove and discard	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

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4-4. TRANSMISSION MAINTENANCE (cont)

e. Transmission Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

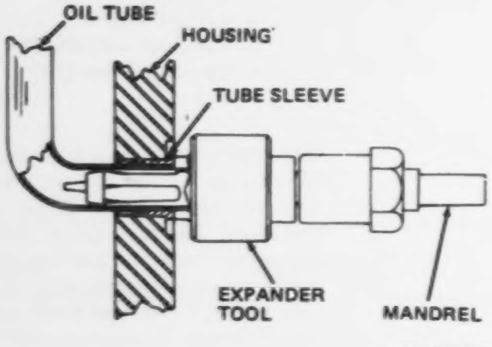
STEP	LOCATION	ITEM	ACTION	REMARKS
5		Transmission housing (34)	Clean	Use cleaning solvent P-D-680. Thoroughly clean interior and exterior of housing. Dry thoroughly using moisture free compressed air or clean cloths
6		All other parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry thoroughly using moisture free compressed air or clean cloths
INSPECTION				
7		Transmission housing (34)	Inspect	Inspect tubes for cracks, damage, wear or evidence of leaking condition. If any of these conditions are observed, remove and replace tubes. Inspect housing for cracks, damage, wear, pits, nicks and distortion. If any of these conditions are observed, replace housing
8		All other parts	Inspect	Inspect for cracks, pits, wear, distortion, and damaged condition. If any of these conditions are observed, replace part
REASSEMBLY				
9	Transmission housing (34)	a. Lubrication clutch tube (31)	Position	
		b. Tube sleeve (33)	Position and press	Over forward end of clutch tube (31). Press firmly into bore of housing

NOTE

Tube ends must remain flush with face of housing.

4-4. TRANSMISSION MAINTENANCE (cont)

e. Transmission Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
9 (cont)		c. Tube sleeve (33) lubrication clutch tube (31)	Install	You must use an expander tool to install tube sleeves and tubes. Pull mandrel shaft out of tool as far as possible and insert expander in tube. Turn mandrel by hand until tool is firmly seated. Use a wrench to turn mandrel as far as possible. Back off mandrel and remove tool  OIL TUBE HOUSING TUBE SLEEVE EXPANDER TOOL MANDREL TA127362
		d. O-ring (32)	Install	Lubricate with OE10 (refer to current lubrication order)
		e. Third speed tube (26)	Position	
		f. Tube sleeves (28 and 30)	Position and press	Over ends of tube (26). Press firmly into bore of housing

NOTE

Tube ends must remain flush with face of housing.

STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Third speed tube (26)	Install	Use expander tool
		h. O-rings (27 and 29)	Install	Lubricate with OE10 (refer to current lubrication order)
		i. Low speed clutch pressure tube (21)	Position	
		j. Tube sleeves (23 and 25)	Position and press	Over ends of tube (21). Press firmly into bore of housing

NOTE

Tube ends must remain flush with face of housing.

STEP	LOCATION	ITEM	ACTION	REMARKS
		k. Low speed clutch pressure tube (21)	Install	Use expander tool

4-4. TRANSMISSION MAINTENANCE (cont)

e. Transmission Housing (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
9 (cont)		l. O-rings (22 and 24)	Install	Lubricate with OE10 (refer to current lubrication order)
		m. Suction tube clip (20)	Position	On suction tube assembly (18)
		n. O-ring (19)	Install	Lubricate with OE10 (refer to current lubrication order)
		o. Suction tube assembly (18)	Position	
		p. Lock washer (17)	Install	
		q. Cap screw (16)	Install	
		r. Two lock washers (15)	Install	
		s. Two cap screws (14)	Install	

WARNING

Dry cleaning solvent P-D-680 used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air and medical attention immediately. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water and get medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
		t. Transmission housing (34)	Clean	Use solvent type cleaning fluid. Thoroughly clean housing and tubes using clean, soft, absorbent, lintless cloth moistened with cleaning fluid. Dry thoroughly with clean, soft absorbent, lintless cloth
10	Transmission housing (34), front	a. O-ring (13)	Install	Lubricate with OE10 (refer to current lubrication order)
		b. Stud (12)	Install	
		c. Third speed pressure plug (11)	Install	
11	Transmission housing (34), rear	a. Elbow (10)	Install	
		b. Connector (9)	Install	In elbow
		c. Dipstick tube (8)	Install	
		d. Dipstick hose (7)	Install	On dipstick tube
		e. Two hose clamps (6)	Install	
		f. Dipstick (5)	Install	
		g. Two dowel pins (4)	Install	
		h. Magnetic drain plug (3)	Install	
12	Transmission housing (34), left side	a. Two plugs (2)	Install	
		b. Plug (1)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly.

This task covers:	a. Disassembly b. Cleaning	c. Inspection d. Reassembly

INITIAL SETUP

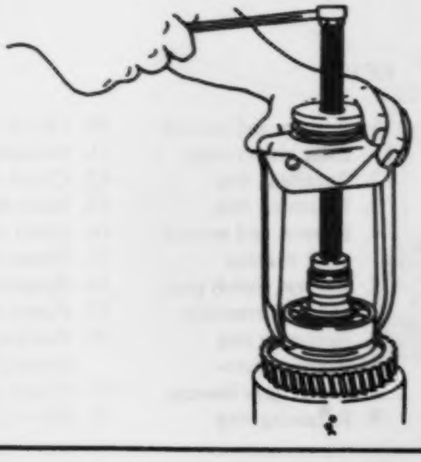
TOOLS
Pry Bars (2)
Sleeve, 6 inches long, 3-1/4 inches outside diameter, 2-3/4 inches inside diameter with a 1-1/2 inch by 1 inch opening
Arbor press, 1/2 ton capacity
Rod, 6 inches long by 3/8 inch diameter
Sleeve, 6 inches long, 2-3/4 inches inside diameter
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Light oil
Retaining rings
Piston rings
Piston seals
OE10 (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4a	Reverse and second clutch assembly removed from transmission.

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Reverse clutch side	a. Three reverse and second shaft piston rings (1)	Remove	
		b. Retaining ring (2)	Remove and discard	
		c. Retaining ring (3)	Remove and discard	
		d. Reverse and second shaft bearing (4)	Remove	Use puller as shown



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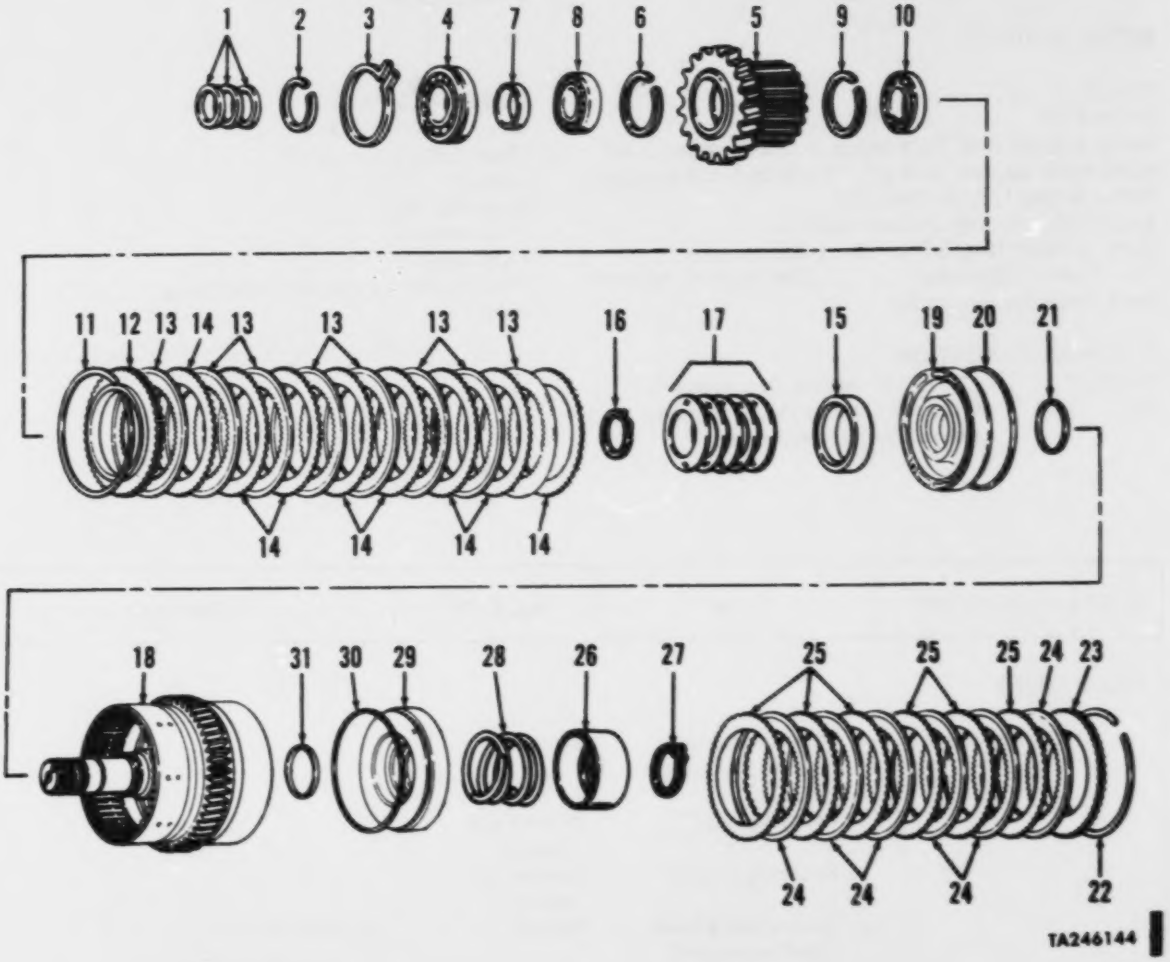
4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).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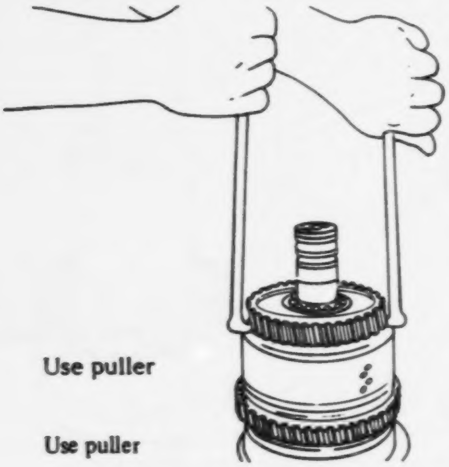
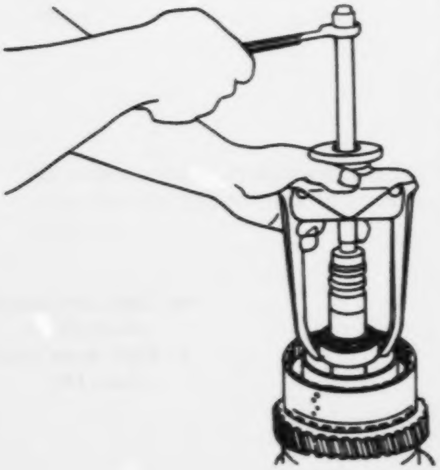
KEY

1. Reverse and second shaft piston rings
2. Retaining ring
3. Retaining ring
4. Reverse and second shaft bearing
5. Reverse clutch gear and hub assembly
6. Retaining ring
7. Bearing spacer
8. Clutch gear bearing
9. Retaining ring
10. Clutch driven gear bearing
11. Retaining ring
12. Clutch disc backing plate
13. Inner clutch discs
14. Outer clutch discs
15. Piston return spring spacer
16. Retaining ring
17. Piston return springs
18. Reverse and second shaft drum and plug assembly
19. Clutch piston
20. Outer clutch piston seal
21. Inner clutch piston seal
22. Retaining ring
23. Clutch disc backing plate
24. Inner clutch discs
25. Outer clutch discs
26. Spring retainer
27. Retaining ring
28. Piston spring
29. Clutch piston
30. Outer clutch piston seal
31. Inner clutch piston seal

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

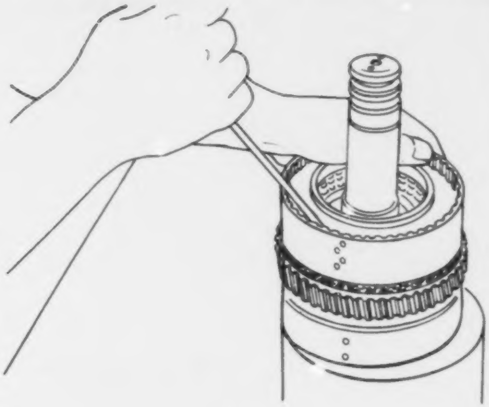
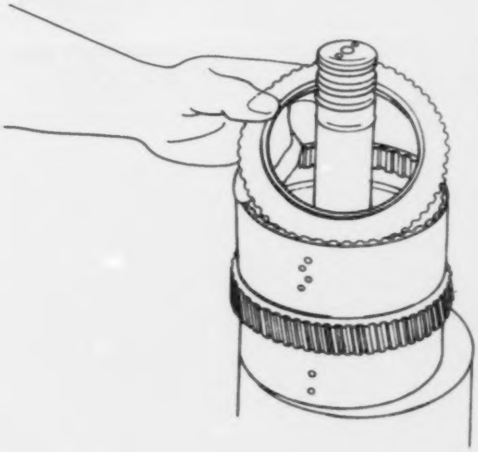
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
1 (cont)		e. Reverse clutch gear and hub assembly (5)	Pry up and remove	Pry reverse clutch gear and hub assembly from clutch assembly using pry bars as shown. Pry far enough to install gear puller then remove gear and hub assembly  TA127365
		f. Retaining ring (6)	Remove and discard	
		g. Bearing spacer (7)	Remove	
		h. Clutch gear bearing (8)	Remove	Use puller
		i. Retaining ring (9)	Remove and discard	
		j. Clutch driven gear bearing (10)	Remove	Use puller



TA127366

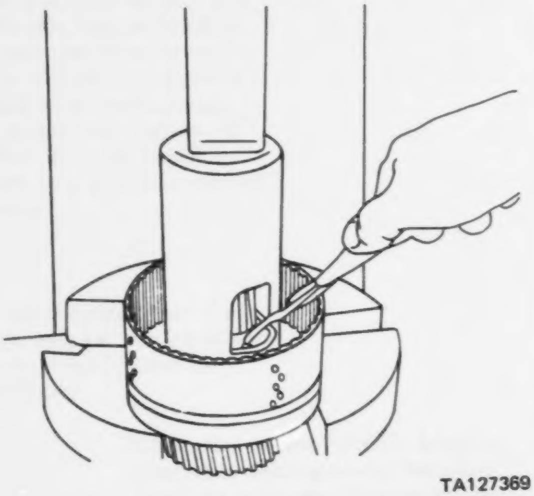
4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
I (cont)		k. Retaining ring (11)	Remove and discard	Use a screwdriver and remove carefully  TA127367
		l. Clutch disc backing plate (12)	Remove	 TA127368
		m. Eight inner clutch discs (13)	Remove	
		n. Eight outer clutch discs (14)	Remove	

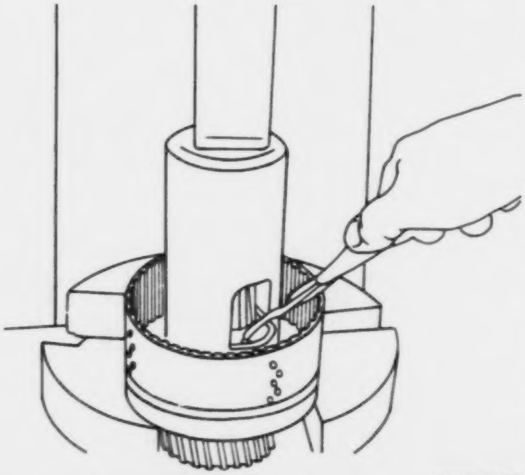
4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
1 (cont)		o. Piston return spring spacer (15)	Compress	Use sleeve (with portion removed) installed in press, for removing retaining ring (16), piston return spring spacer (15), and piston return springs (17)  TA127369
		p. Retaining ring (16)	Remove and discard	Through opening in sleeve
		q. Piston return spring spacer (15)	Release and remove	Carefully and slowly release pressure on sleeve
		r. Five piston return springs (17)	Remove	
		s. Reverse and second shaft drum and plug assembly (18)	Invert	
		t. Clutch piston (19)	Remove	Tap reverse and second shaft drum and plug assembly (18) on block of wood to remove
		u. Outer clutch piston seal (20)	Remove and discard	
		v. Inner clutch piston seal (21)	Remove and discard	
2	Second clutch side	a. Retaining ring (22)	Remove and discard	
		b. Clutch disc backing plate (23)	Remove	
		c. Six inner clutch discs (24)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
2 (cont)		d. Six outer clutch discs (25)	Remove	
		e. Spring retainer (26)	Compress	Use sleeve with portion removed for removing spring retainer (26), retaining ring (27) and piston spring (28)  TA127369
		f. Retaining ring (27)	Remove and discard	Through opening in sleeve
		g. Spring retainer (26)	Release and remove	Carefully and slowly release pressure on sleeve
		h. Piston spring (28)	Remove	
		i. Reverse and second shaft drum and plug assembly (18)	Invert	
		j. Clutch piston (29)	Remove	Tap reverse and second shaft drum and plug assembly on block of wood to remove clutch piston
		k. Outer clutch piston seal (30)	Remove and discard	
		l. Inner clutch piston seal (31)	Remove and discard	

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

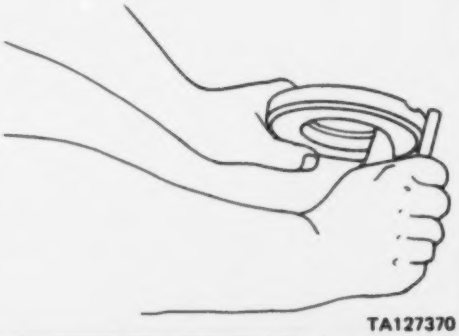
Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
3		Bearings (4, 8, 10)	Clean	Use cleaning solvent P-D-680. Immerse bearings in cleaning solvent and move slowly up and down. Remove bearings. Strike larger side of cone against block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning solvent. Repeat this process until bearings are thoroughly clean. Dry bearings with moisture-free compressed air. Direct air stream across bearing. Do not spin the bearings when drying. Rotate bearings slowly by hand to facilitate drying.
4		All other parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using moisture-free compressed air or clean cloths

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

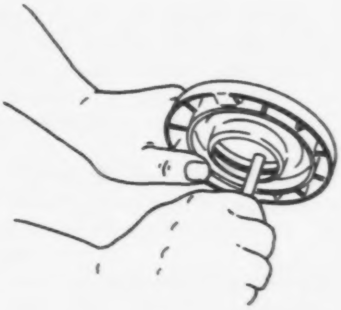
STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
5		Reverse and second shaft drum and plug assembly (18)	Inspect	Inspect teeth for wear, pits, cracks, nicks and scores. Inspect shaft and quills to make certain they are not sprung, bent or have twisted splines, and that shafts are true. Inspect overall for wear, cracks, distortion and damage. If any of these conditions are observed, replace reverse and second shaft drum and plug assembly
6		Inner clutch discs (13, 24), outer clutch discs (14, 25)	Inspect	Inspect each disc for wear, cracks, damage and breaks. If any of these conditions are observed, replace disc
7		Piston return springs (17), piston spring (28)	Inspect	Inspect for cracks, distortion, broken condition, wear and evidence of permanent set. If any of these conditions are observed, replace spring
8		Bearings (4, 8, 10)	Inspect	Inspect rollers and cages for wear, chips, nicks and damage. If any of these conditions are observed, replace bearing. Dip bearings in clean light oil and wrap in clean lintless cloth or paper
9		All other parts	Inspect	Inspect for wear, damage, cracks and distortion. If any of these conditions are observed, replace part
REASSEMBLY				
10	Clutch piston (29)	a. Outer clutch piston seal (30)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston



TA127370

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
10 (cont)		b. Inner clutch piston seal (31)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston  TA127371

NOTE

Seals must be sized before installing clutch piston in drum and plug assembly (18).

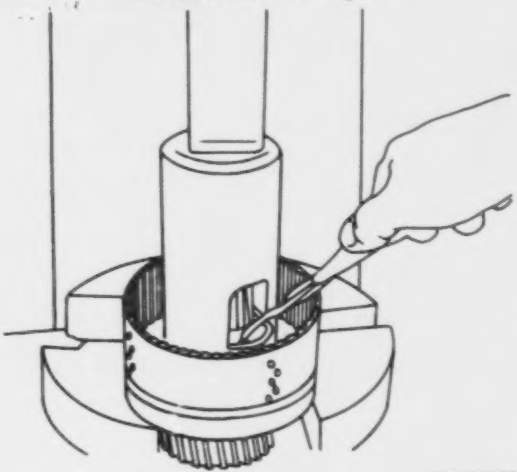
CAUTION

Use care to not damage inner and outer seals.

11	Second clutch side	a. Clutch piston (29)	Install	
		b. Piston spring (28)	Position	
		c. Spring retainer (26)	Position	
		d. Retaining ring (27)	Position	

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
11 (cont)		e. Spring retainer (26), piston spring (28)	Compress	Use sleeve installed in press  TA127369
		f. Retaining ring (27)	Install	Install retaining ring through opening in sleeve; remove sleeve
		g. Outer clutch disc (25)	Install	Install one, after applying light film of OE10 (refer to current lubrication order)
		h. Inner clutch disc (24)	Install	Install one, after applying light film of EO10 (refer to current lubrication order)
		i. Outer clutch disc (25), inner clutch disc (24)	Install	Coat each disc lightly with OE10 grease (refer to current lubrication order). Position an outer disc (25) next to an inner disc (24) until all discs are installed. Last disc is an inner disc
		j. Clutch backing plate (23)	Install	
		k. Retaining ring (22)	Install	
	Clutch piston (19)	a. Outer clutch piston seal (20)	Install and size	Size seal as described in step 10 above
		b. Inner clutch piston seal (21)	Install and size	Size seal as described in step 10 above

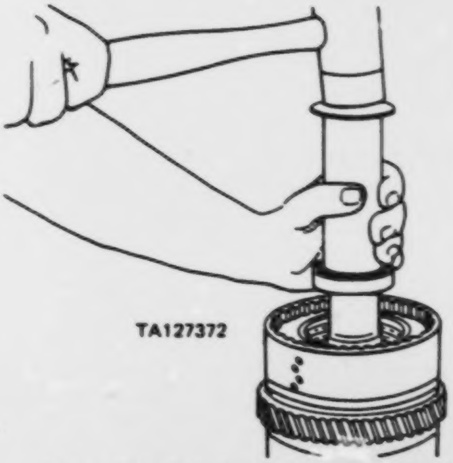
NOTE

Seals must be sized before installing clutch piston in drum and plug assembly.

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
		CAUTION Use care to not damage inner and outer seals.		
13	Reverse clutch side	a. Clutch piston (19)	Install	
		b. Piston return spring spacer (15)	Position	
		c. Five piston return springs (17)	Install	Position first piston return spring with curved side up, then alternate remaining piston return springs
		d. Retaining ring (16)	Position	On drum and plug assembly (18)
		e. Piston return spring spacer (15)	Compress	Use sleeve installed in press
		f. Retaining ring (16)	Install	Install retaining ring through opening in sleeve; remove sleeve after installation
		g. Outer clutch disc (14)	Install	Install one outer clutch disc
		h. Inner clutch disc (13)	Install	Install one
		i. Outer clutch disc (14), inner clutch disc (13)	Install	Install remaining discs, alternating between outer clutch discs and inner clutch discs. The last disc installed is inner clutch disc
		j. Clutch disc backing plate (12)	Install	
		k. Retaining ring (11)	Install	
		l. Clutch driven gear bearing (10)	Install	Use mallet and sleeve
		m. Retaining ring (9)	Install	
		n. Bearing spacer (7)	Install	
		o. Retaining ring (6)	Install	
		CAUTION Do not force this procedure.		
		p. Reverse clutch gear and hub assembly (5)	Install	Align splines on hub with internal teeth of discs. Tap hub gently into position. Hub splines must be in full position with internal teeth of all discs



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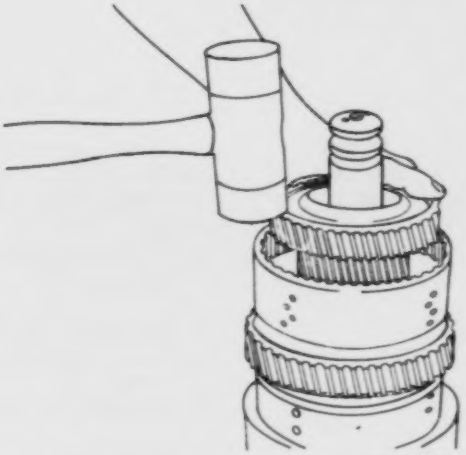
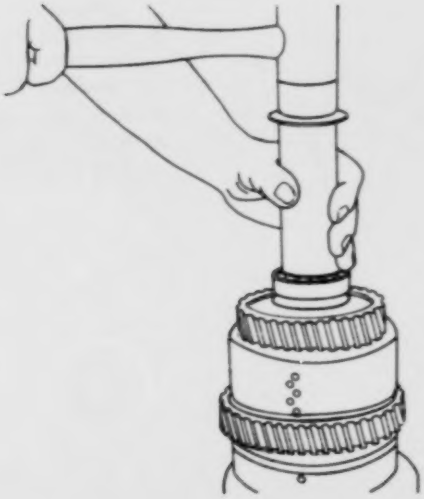
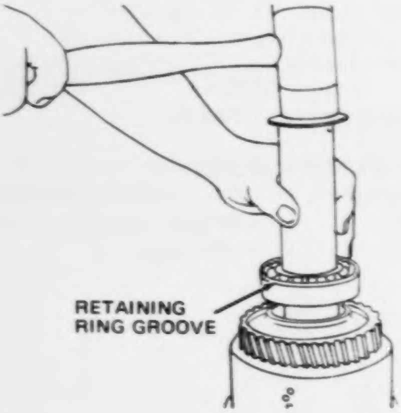
4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
13 (cont)				 TA127373
		q. Clutch gear bearing (8)	Install	Use mallet and sleeve
				 TA127374

4-4. TRANSMISSION MAINTENANCE (cont)

f. Reverse and Second Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
13 (cont)		r. Reverse and second shaft bearing (4)	Install	Use mallet and sleeve  TA127375

NOTE

Install reverse and second shaft bearing (4) with retaining ring groove at top.

STEP	LOCATION	ITEM	ACTION	REMARKS
		s. Retaining ring (3)	Install	Into reverse and second shaft bearing groove
		t. Retaining ring (2)	Install	
		u. Three reverse and second shaft piston rings (1)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

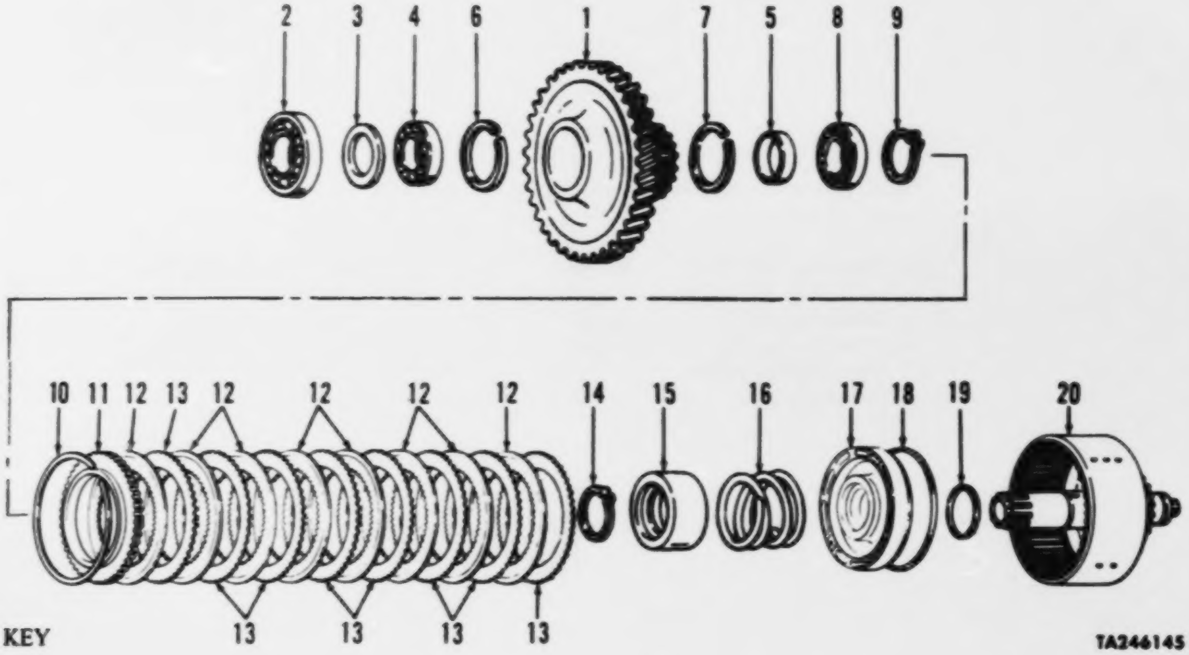
INITIAL SETUP

TOOLS
Sleeve, 6 inches long, 3-1/4 inches outside diameter, 2-3/4 inches inside diameter with a 1-1/2 inch opening
Arbor press, 1/2 ton capacity
Rod, 6 inches long by 3/8 inch diameter
Sleeve, 6 inches long, 2-3/4 inches inside diameter
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4d	Low clutch assembly removed from transmission.

MATERIALS/PARTS
Light oil
Cleaning solvent P-D-680
Clean cloths NSN 8030-00-873-4792
Locating rings
Retaining rings
Piston seals
OE10 (refer to current lubrication order)



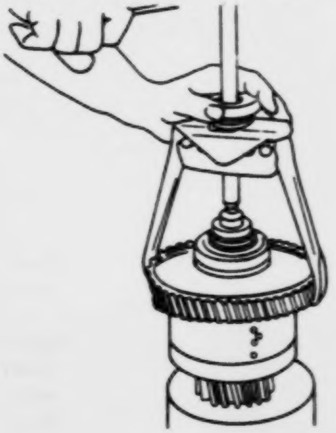
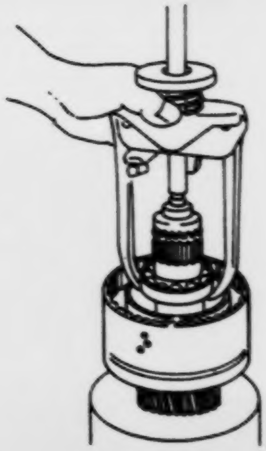
TA246145

KEY

1. Low shaft gear and hub assembly
2. Front bearing
3. Spacer
4. Low speed gear bearing
5. Low speed gear spacer
6. Bearing locating ring
7. Bearing locating ring
8. Low speed gear bearing
9. Low speed bearing retaining ring
10. Retaining ring
11. Clutch disc backing plate
12. Inner clutch discs
13. Outer clutch discs
14. Retaining ring
15. Spring retainer
16. Piston return spring
17. Clutch piston
18. Outer clutch piston seal
19. Inner clutch piston seal
20. Low clutch shaft drum and bleed valve assembly

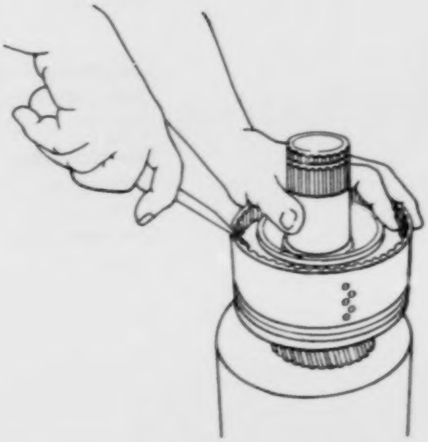
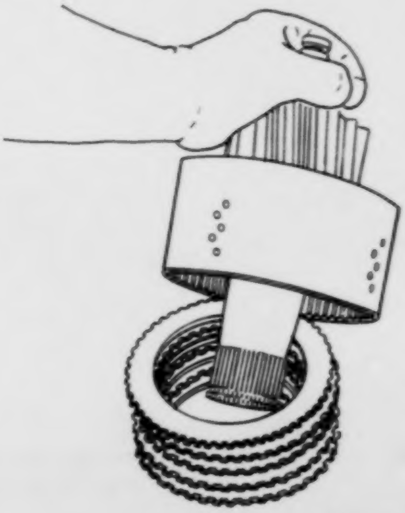
4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1		Front bearing (1)	Remove	Use puller
2		Spacer (2)	Remove	
3		Low shaft gear and hub assembly (3)	Remove	As shown below using puller
4		Low speed gear bearing (4)	Remove	To remove from gear and hub assembly (1) use puller or press  TA127377
5		Low speed gear spacer (5)	Remove	
6		Bearing locating ring (6 and 7)	Remove and discard	
7		Low speed gear bearing (8)	Remove	
8		Low speed bearing retaining ring (9)	Remove and discard	 TA127378

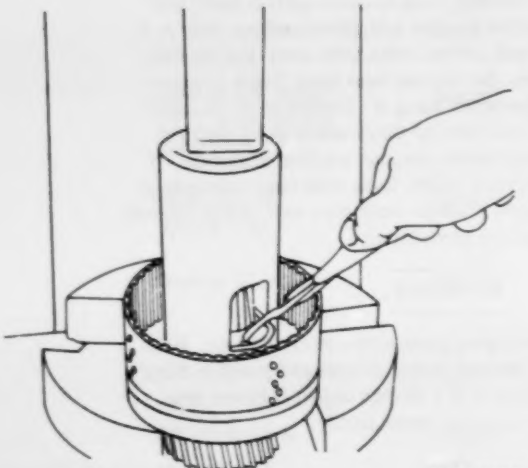
4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
9		Retaining ring (10)	Remove and discard	 TA127379
10		Clutch disc backing plate (11)	Remove	
11		Eight inner clutch discs (12) and outer clutch discs (13)	Remove	Turn low clutch shaft drum and bleed valve assembly over to remove as shown below  TA127380

4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
12		Retaining ring (14)	Remove and discard	Install sleeve in press; place low clutch assembly on press and compress spring retainer (15). Remove retaining ring through opening in sleeve as shown. Carefully and slowly release pressure on spring retainer
		 TA127369		
13		Spring retainer (15)	Remove	
14		Piston return spring (16)	Remove	
15		Clutch piston (17)	Remove	Turn low clutch shaft drum and bleed valve assembly over and tap on block of wood to remove
16		Outer clutch piston seal (18)	Remove and discard	
17		Inner clutch piston seal (19)	Remove and discard	

4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

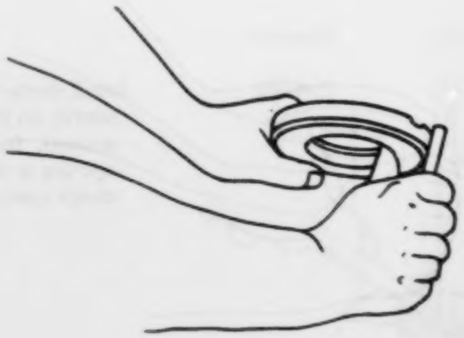
Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
18		Bearings (2, 4, 8)	Clean	Use cleaning solvent P-D-680. Immerse bearings in cleaning solvent and move slowly up and down. Remove bearings. Strike larger side of cone against block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning solvent. Repeat this process until bearings are thoroughly clean. Dry bearings with moisture-free compressed air. Direct air stream across bearing. Do not spin the bearings when drying. Rotate bearings slowly by hand to facilitate drying
19		All parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using compressed air or clean cloths

4-4. TRANSMISSION MAINTENANCE (cont)

g. *Low Clutch Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
20		Low clutch shaft drum and bleed valve assembly (20)	Inspect	Inspect teeth for wear, pits, cracks, chips, nicks and scores. Inspect body for cracks, wear, distortion and damage. If any of these conditions are observed, replace drum and bleed valve assembly
21		Inner clutch discs (12), outer clutch discs (13)	Inspect	Replace disc if worn, cracked, damaged or broken
22		Piston return spring (16)	Inspect	Replace if cracked, worn, distorted, broken or permanently set
23		Bearings (2, 4, 8)	Inspect	Inspect rollers and cages for wear, chips, nicks and damage. Replace if any of these conditions are observed. Dip bearings in clean light oil and wrap in clean lintless cloth or paper
24		All other parts	Inspect	Inspect for wear, damage, cracks and distortion. If any of these conditions are observed, replace part
REASSEMBLY				
25		Outer clutch piston seal (18)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston

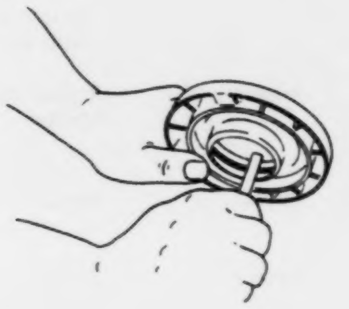


TA127370

4-4. TRANSMISSION MAINTENANCE (cont)

g. *Low Clutch Assembly (cont).*

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
26		Inner clutch piston seal (19)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston



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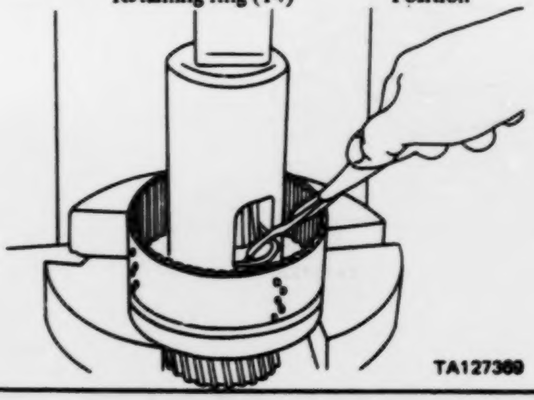
NOTE

Seals must be sized before installing clutch piston in low clutch shaft drum and bleed valve assembly (20).

CAUTION

Don't damage inner or outer seals.

STEP	LOCATION	ITEM	ACTION	REMARKS
27		Clutch piston (17)	Install	
28		Piston return spring (16)	Position	
29		Spring retainer (15)	Position	
30		Retaining ring (14)	Position	Install sleeve in press; place low clutch assembly on press and compress spring retainer. Install retaining ring through opening in sleeve as shown. Remove low clutch assembly and sleeve from press



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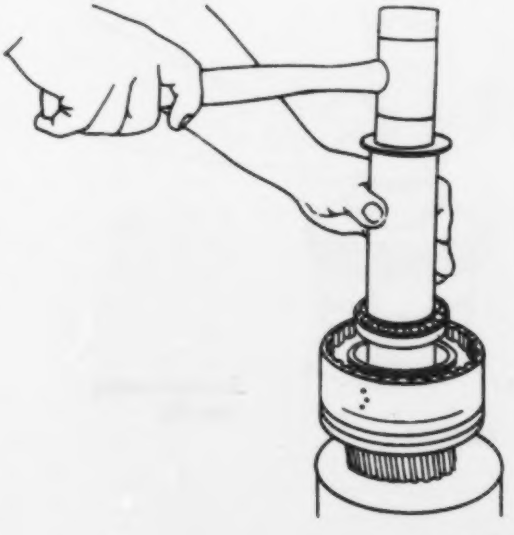
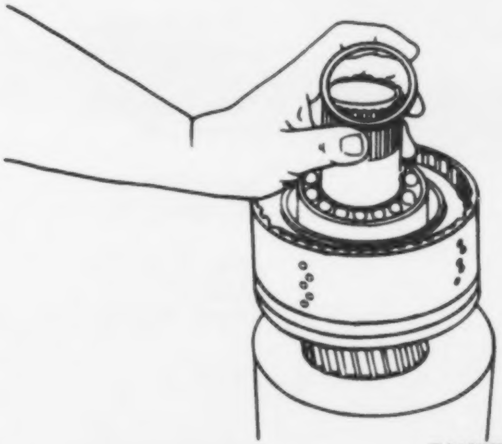
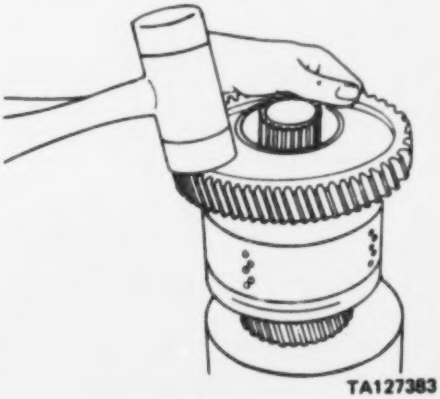
4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
31		Low speed bearing retaining ring (9)	Install	
32		Outer clutch disc (steel) (13)	Install	Install one disc, after applying light film of OE10 (refer to current lubrication order)
33		Inner clutch disc (friction) (12)	Install	Install one disc, after applying light film of OE10 (refer to current lubrication order)
34		Outer clutch discs (13) and inner clutch discs (12)	Install	Coat each disc lightly with OE10 grease (refer to current lubrication order). Position outer (steel) disc (13) next to an inner (friction) disc (12) until all discs are installed. The last disc installed is an inner disc. Align teeth of all discs
35		Clutch disc backing plate (11)	Install	
36		Retaining ring (10)	Install	
37		Low speed gear bearing (8)	Install	 TA127381
38		Bearing locating ring (7)	Install	

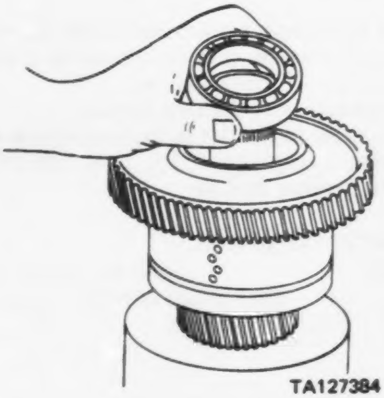
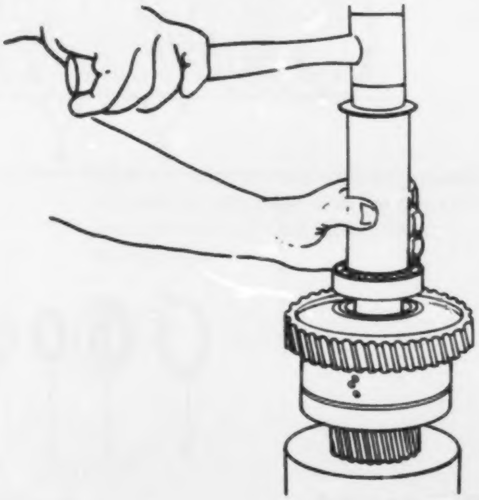
4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
39		Low speed gear spacer (5)	Install	 TA127382
40		Low shaft gear and hub assembly (1)	Install	Align splines on clutch hub with internal teeth of friction discs. Don't force installation. Gear splines must mesh with internal teeth of all friction discs  TA127383
41		Bearing locating ring (6)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

g. Low Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
42		Low speed gear bearing (4)	Install	 TA127384
43		Spacer (3)	Install	
44		Front bearing (2)	Install	 TA127385

4-4. TRANSMISSION MAINTENANCE (cont)

h. Third Clutch Assembly.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS

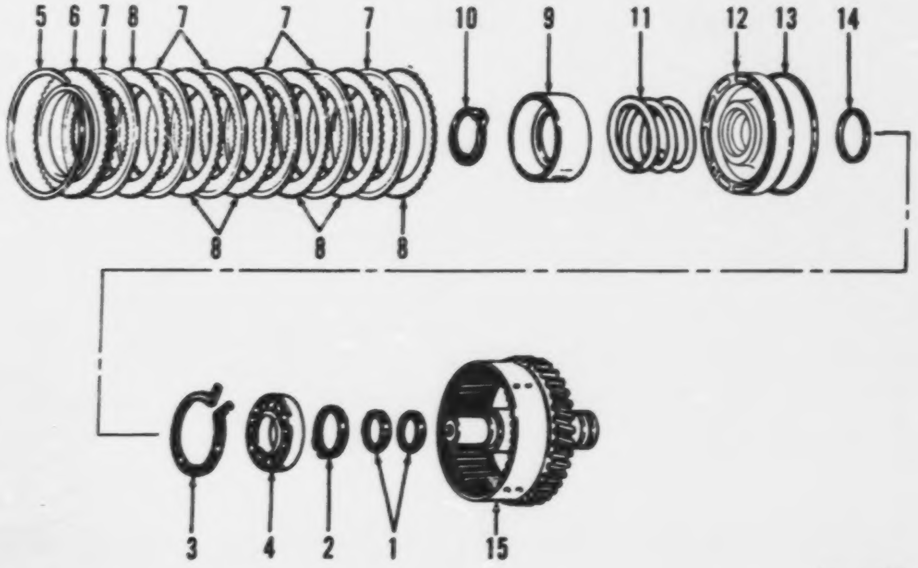
Sleeve, 6 inches long, 3-1/4 inches outside diameter, 2-3/4 inches inside diameter with a 1-1/2 inch by 1 inch opening
Arbor press, 1/2 ton capacity
Rod, 6 inches long by 3/8 inch diameter
Sleeve, 6 inches long, 2-3/4 inches inside diameter
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4d	Third clutch assembly removed from transmission.

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Light oil
Retaining rings
Piston rings
Piston seals
Locating rings
OE10 (refer to current lubrication order)



KEY

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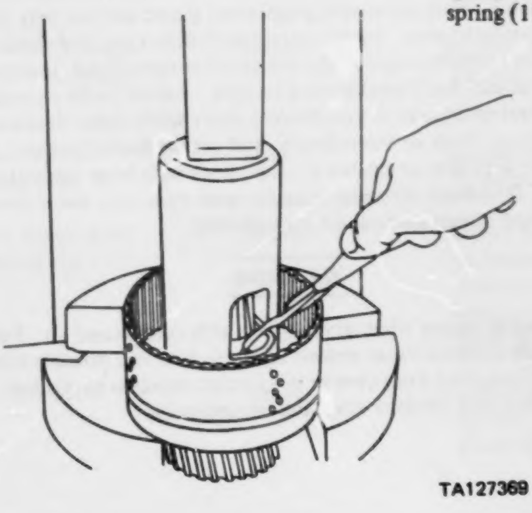
1. Third clutch shaft piston rings
2. Retaining ring
3. Third clutch shaft front bearing locating ring
4. Third clutch shaft front bearing
5. Retaining ring
6. Clutch disc backing plate
7. Inner clutch discs
8. Outer clutch discs
9. Spring retainer
10. Retaining ring
11. Piston return spring
12. Clutch piston
13. Outer clutch piston seal
14. Inner clutch piston seal
15. Third clutch shaft drum and plug assembly

4-4. TRANSMISSION MAINTENANCE (cont)

h. Third Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1		Two third clutch shaft piston rings (1)	Remove and discard	
2		Retaining ring (2)	Remove and discard	
3		Third clutch shaft front bearing locating ring (3)	Remove and discard	
4		Third clutch shaft front bearing (4)	Remove	Use puller
5		Retaining ring (5)	Remove and discard	
6		Clutch disc backing plate (6)	Remove	
7		Six inner clutch discs (7)	Remove	
8		Six outer clutch discs (8)	Remove	
9		Spring retainer (9)	Compress	Use sleeve (with portion removed) installed in press, for removing retaining ring (10), spring retainer (9) and piston return spring (11)



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4-4. TRANSMISSION MAINTENANCE (cont)

h. Third Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
10		Retaining ring (10)	Remove and discard	Remove through opening in sleeve; carefully and slowly release pressure on spring; then remove sleeve
11		Spring retainer (9)	Remove	
12		Piston return spring (11)	Remove	
13		Third clutch shaft drum and plug assembly (15)	Invert	
14		Clutch piston (12)	Remove	Tap third clutch shaft drum and plug assembly on block of wood to remove
15		Outer clutch piston seal (13)	Remove and discard	
16		Inner clutch piston seal (14)	Remove and discard	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

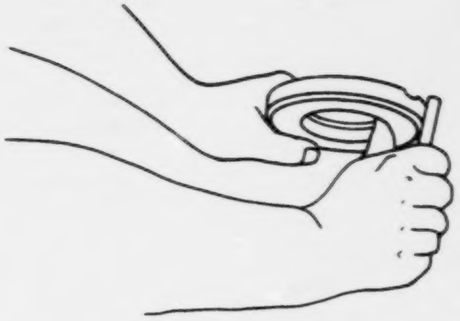
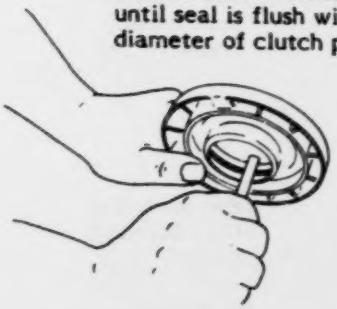
4-4. TRANSMISSION MAINTENANCE (cont)

h. Third Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
17		Third clutch shaft front bearing (4)	Clean	Use cleaning solvent P-D-680. Immerse bearing in cleaning solvent and move slowly up and down. Remove bearing. Strike larger side of cone against block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid. Repeat this process until bearings are thoroughly clean. Dry with moisture-free compressed air. Direct air stream across bearing. Do not spin bearings when drying. Rotate bearings slowly by hand to facilitate drying
18		All other parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using compressed air or clean cloths
INSPECTION				
19		Third clutch shaft drum and plug assembly (15)	Inspect	Inspect teeth for wear, pits, cracks, nicks and scores. Inspect shaft and quills to make certain they are not sprung, bent or have twisted splines, and that shafts are true. Inspect overall for wear, cracks, distortion and damage. If any of these conditions are observed, replace part
20		Inner clutch discs (7), outer clutch discs (8)	Inspect	Replace disc if worn, cracked, damaged or broken
21		Piston return spring (11)	Inspect	Replace if cracked, worn, distorted, broken or permanently set
22		Third clutch shaft bearing (4)	Inspect	Inspect rollers and cages for wear, chips, nicks and damage. If any of these conditions are observed, replace bearing. Dip bearing in clean light oil and wrap in clean lintless cloth or paper
23		All other parts	Inspect	Inspect for damage, wear, cracks and distortion. If any of these conditions are observed, replace part

4-4. TRANSMISSION MAINTENANCE (cont)

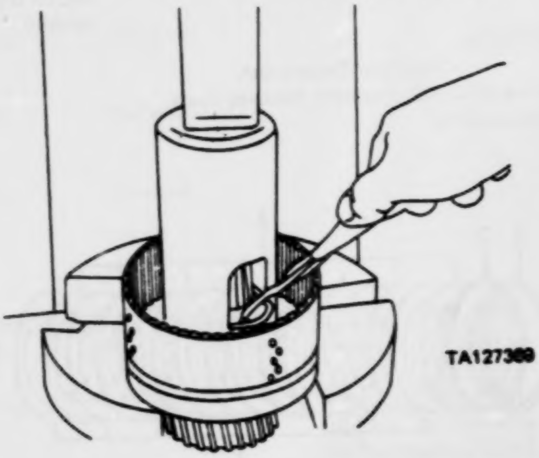
h. Third Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
24	Clutch piston (12)	a. Outer clutch piston seal (13)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston.
				TA127370
		b. Inner clutch piston seal (14)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston  TA127371
		NOTE Seals must be sized before installing clutch piston into drum and plug assembly (15). **CAUTION** Use care to not damage inner and outer seals.		
25	Third clutch shaft drum and plug assembly (15)	a. Clutch piston (12) b. Piston return spring (11) c. Spring retainer (9)	Install Position Position	

4-4. TRANSMISSION MAINTENANCE (cont)

h. Third Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
		d. Retaining ring (10)	Position	
		e. Spring retainer (9)	Compress	Use sleeve installed in press
		f. Retaining ring (10)	Install	Install retaining ring through opening in sleeve; remove sleeve



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STEP	LOCATION	ITEM	ACTION	REMARKS
		g. Outer clutch disc (8)	Install	Install one only, coated lightly with OE10 (refer to current lubrication order)
		h. Inner clutch disc (7)	Install	Install one only, coated lightly with OE10 (refer to current lubrication order)
		i. Outer clutch discs (8), inner clutch discs (7)	Install	Coat remaining discs lightly with OE10 (refer to current lubrication order). Alternate outer and inner disc until all are installed. The last disc installed is inner clutch disc
		j. Clutch disc backing plate (6)	Install	
		k. Retaining ring (5)	Install	
		l. Third clutch shaft drum and plug assembly (15)	Invert	
		m. Third clutch shaft front bearing (4)	Install	Use sleeve and mallet to install
		n. Third clutch shaft front bearing locating ring (3)	Install	
		o. Retaining ring (2)	Install	
		p. Two third clutch shaft piston rings (1)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

i. Forward Clutch Assembly.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS

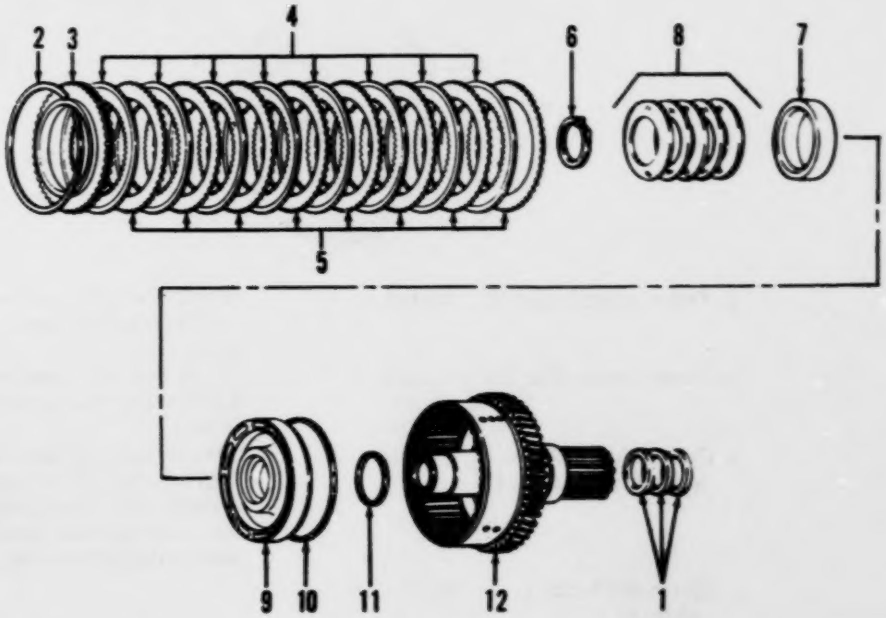
Sleeve, 6 inches long, 3-1/4 inches outside diameter, 2-3/4 inches inside diameter with a 1-1/2 inch by 1 inch opening
Arbor press, 1/2 ton capacity
Rod, 6 inches long by 3/8 inch diameter
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
Retaining rings
Piston rings
Piston seals
OE10 (refer to current lubrication order)

EQUIPMENT CONDITION

Paragraph	Condition Description
4-4d	Forward clutch assembly removed from transmission.



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KEY

1. Forward shaft piston rings
2. Retaining ring
3. Clutch disc backing plate
4. Inner clutch discs
5. Outer clutch discs
6. Retaining ring
7. Piston return spring spacer
8. Piston return springs
9. Clutch piston
10. Outer clutch piston seal
11. Inner clutch piston seal
12. Forward shaft drum and plug assembly

4-4. TRANSMISSION MAINTENANCE (cont)

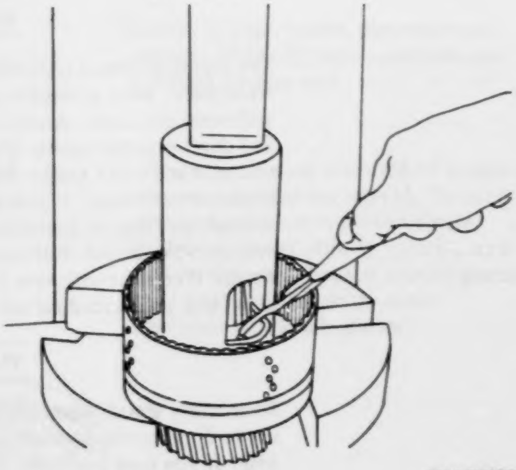
i. Forward Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1		Three forward shaft piston rings (1)	Remove and discard	
2		Retaining ring (2)	Remove and discard	Use pliers
3		Clutch disc backing plate (3)	Remove	
4		Eight inner clutch discs (4)	Remove	
5		Eight outer clutch discs (5)	Remove	

NOTE

The outer clutch disc next to the clutch piston will have a backing ring on it.

STEP	LOCATION	ITEM	ACTION	REMARKS
6		Piston return spring spacer (7)	Compress	Use sleeve (with portion removed) installed in press, for removing retaining ring (6), spring spacer (7), and piston return springs (8)



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4-4. TRANSMISSION MAINTENANCE (cont)

i. Forward Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
7		Retaining ring (6)	Remove and discard	Remove through opening in sleeve
8		Piston return spring spacer (7)	Release and remove	Carefully and slowly release pressure on spring, then remove sleeve
9		Five piston return springs (8)	Remove	
10		Forward shaft drum and plug assembly (12)	Invert	
11		Clutch piston (9)	Remove	Tap forward shaft drum and plug assembly on block of wood to remove clutch piston
12		Outer clutch piston seal (10)	Remove and discard	
13		Inner clutch piston seal (11)	Remove and discard	
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

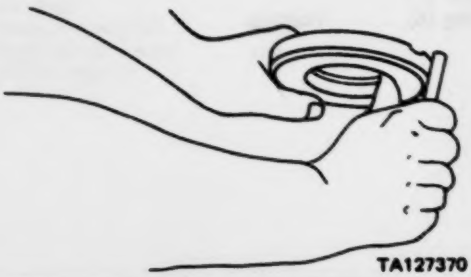
WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

4-4. TRANSMISSION MAINTENANCE (cont)

i. Forward Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
14		All parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using compressed air or clean cloths
INSPECTION				
15		Forward shaft drum and plug assembly (12)	Inspect	Inspect teeth for wear, pits, cracks, nicks and scores. Inspect shaft and quills to make certain they are not sprung, bent or have twisted splines and that shafts are true. Inspect overall for wear, cracks, distortion and damage. If any of these conditions are observed, replace forward shaft drum and plug assembly
16		Inner clutch discs (4), outer clutch discs (5)	Inspect	Replace disc if worn, cracked, damaged or broken
17		Piston return springs (8)	Inspect	Replace if cracked, worn, distorted, broken or permanently set
18		All other parts	Inspect	Inspect for wear, cracks, distortion and damage. If any of these conditions are observed, replace part
REASSEMBLY				
19	Clutch piston (9)	a. Outer clutch piston seal (10)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston



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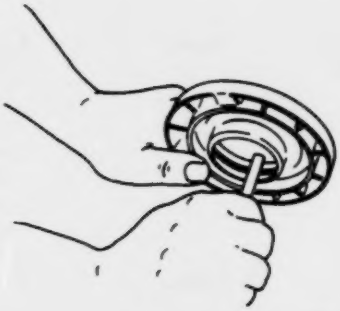
4-4. TRANSMISSION MAINTENANCE (cont)

i. Forward Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
19 (cont)		b. Inner clutch piston seal (11)	Install and size	Lubricate oil seal with OE10 (refer to current lubrication order). To size seal, rotate clutch piston while holding a round object against new seal as shown. Rotate clutch piston until seal is flush with outer diameter of clutch piston



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NOTE

Seals must be sized before installing clutch piston into drum and plug.

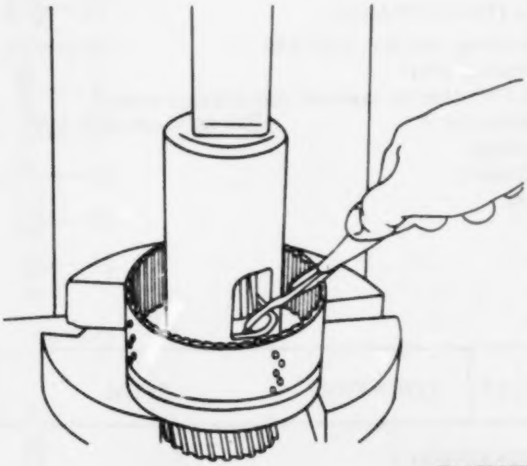
CAUTION

Use care to not damage inner and outer seals.

STEP	LOCATION	ITEM	ACTION	REMARKS
20	Forward shaft drum and plug assembly (12)	a. Clutch piston (9)	Install	
		b. Five piston return springs (8)	Position	Install first piston return spring with curved side up, then alternate the remaining piston return springs
		c. Piston return spring spacer (7)	Position	
		d. Retaining ring (6)	Position	

4-4. TRANSMISSION MAINTENANCE (cont)

i. Forward Clutch Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
20 (cont)		e. Piston return spring spacer (7)	Compress	Use sleeve (with cut out) installed in press  TA127369
		f. Retaining ring (6)	Install	Install retaining ring through opening in sleeve, remove sleeve
		g. Outer clutch disc (5)	Install	Apply light film of OE10 (refer to current lubrication order), then install outer clutch disc with backing ring only
		h. Inner clutch disc (4)	Install	Install one only after coating lightly with OE10 (refer to current lubrication order)
		i. Outer clutch discs (5), inner clutch discs (4)	Install	Coat remaining discs lightly with OE10 (refer to current lubrication order). Install discs by alternating outer and inner discs until all are installed. The last disc installed is inner clutch disc
		j. Clutch disc backing plate (3)	Install	
		k. Retaining ring (2)	Install	
		l. Three forward shaft piston rings (1)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly.

This task covers repair of the control valve assembly consisting of:

- a. Disassembly
- b. Cleaning
- c. Inspection
- d. Reassembly

INITIAL SETUP

TOOLS

Automotive Mechanic's Tool Kit NSN 5180-00-754-0641

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
OE10 (refer to current lubrication order)
Permatex 2 NSN 8030-00-873-4792
O-rings
Oil seals
Seal

EQUIPMENT CONDITION

Paragraph	Condition Description
3-19d	Control valve assembly removed from transmission.

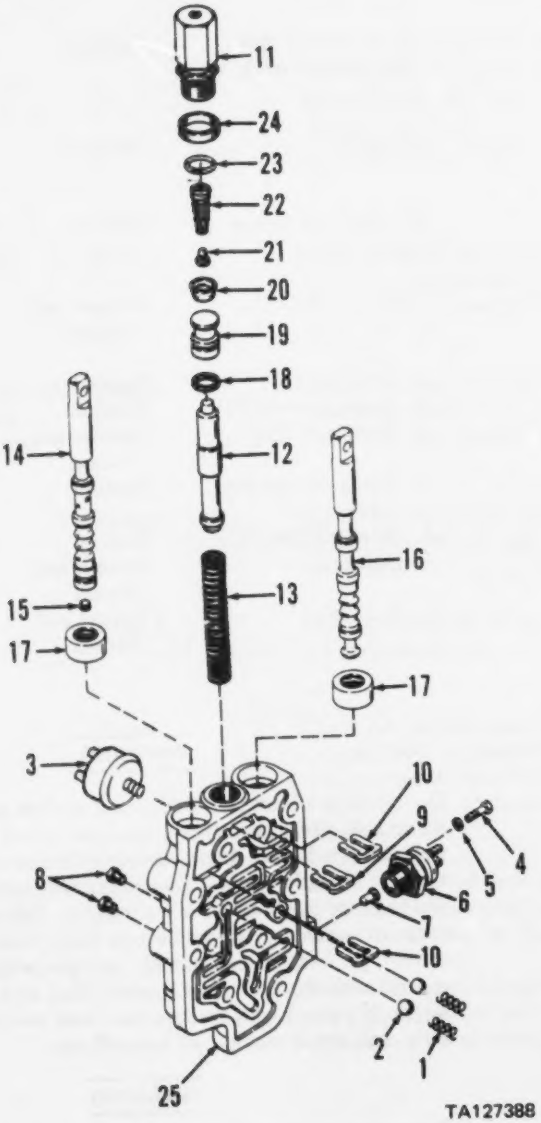
STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1		Two detent springs (1) and detent balls (2)	Remove	
2		Back-up alarm switch (3)	Remove	
3		Two screws (4) and lock washers (5)	Remove	From neutral start switch
4		Neutral start switch (6) and actuating pin (7)	Remove	
5		Two pipe plugs (8)	Remove	
6		Three valve spool stops (9 and 10)	Remove	
7		Hydraulic actuator assembly (11)	Remove	
8		Declutch valve spool (12)	Remove	
9		Valve spool spring (13)	Remove	

4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly (cont).

KEY

1. Detent springs
2. Detent balls
3. Back-up alarm switch
4. Screws
5. Lock washers
6. Neutral start switch
7. Actuating pin
8. Pipe plugs
9. Valve spool stop
10. Valve spool stops
11. Hydraulic actuator assembly
12. Declutch valve spool
13. Valve spool spring
14. Speed selector spool and plug assembly
15. Plug
16. Forward and reverse spool
17. Oil seals
18. Glyd ring
19. Inching piston
20. Piston seal
21. Spring retainer pin
22. Balance spring
23. O-ring
24. Band seal
25. Control valve housing assembly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4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
10		Speed selector spool and plug assembly (14)	Remove	
11		Plug (15)	Remove	From speed selector spool and plug assembly
12		Forward and reverse spool (16)	Remove	
13		Two oil seals (17)	Remove and discard	Carefully pry from control valve housing
14	Hydraulic actuator assembly (11)	a. Glyd ring (18)	Remove	
		b. Inching piston (19)	Remove	
		c. Piston seal (20)	Remove and discard	
		d. Spring retainer pin (21)	Remove	
		e. Balance spring (22)	Remove	
		f. O-ring (23)	Remove and discard	
		g. Seal (24)	Remove and discard	

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
15		All parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using compressed air or clean cloths
INSPECTION				
16		Control valve housing assembly (25)	Inspect	Inspect seats and spool bores for cracks and wear, damage and distortion. If any of these conditions are observed, replace part
17		Declutch valve spool (12), speed selector spool (14), and forward and reverse spool (16)	Inspect	Inspect for wear, damage, bent or broken condition and distortion; if any of these conditions are observed replace part
18		Detent balls (2)	Inspect	Inspect for flat or out of round condition, cracks, or other damage. Replace if any of these conditions are observed
19		Detent springs (1) and balance spring (22)	Inspect	Replace if cracked, worn, distorted, broken or permanently set
20		Back-up alarm switch (3)	Inspect	Check for cracked insulating material around body or terminals. Check for loose, missing, or corroded terminals. Replace if any of these conditions are observed
21		Neutral start switch (6)	Inspect	Check for cracked body and corrosion in terminal contact area; replace if any of these conditions are observed
22		All other parts	Inspect	Inspect for wear, damage, cracks, and distortion; replace part if any of these conditions are observed

4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly (cont).

REASSEMBLY

NOTE

Immerse all parts in OE10 (refer to current lubrication order) before reassembling parts.

STEP	LOCATION	ITEM	ACTION	REMARKS
23	Hydraulic actuator assembly (11)	a. Seal (24)	Install	Apply light coat of Permatex 2 around outer diameter
		b. O-ring (23)	Install	
		c. Balance spring (22)	Install	
		d. Spring retainer pin (21)	Install	
		e. Piston seal (20)	Install	Apply light coat of Permatex 2 around outer diameter of seal
		f. Inching piston (19)	Install	
		g. Glyd ring (18)	Install	
24	Control valve housing assembly (25)	a. Two oil seals (17)	Install	Apply light coat of Permatex 2 around outer diameter of seal. Seal is properly installed when flush with top of housing assembly

CAUTION

When installing spools in housing assembly, be careful not to damage oil seals (17).

STEP	LOCATION	ITEM	ACTION	REMARKS
		b. Forward and reverse spool (16)	Install	
		c. Plug (15)	Install	In speed selector spool (14)
		d. Speed selector spool and plug assembly (14)	Install	
		e. Two valve spool stops (10)	Install	
		f. Valve spool spring (13)	Install	
		g. Declutch valve spool (12)	Install	
		h. Hydraulic actuator assembly (11)	Install	
		i. Valve spool stop (9)	Install	
		j. Two pipe plugs (8)	Install	
		k. Actuating pin (7)	Install	
		l. Neutral start switch (6)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

j. Control Valve Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
24 (cont)		**NOTE** If neutral start switch has been replaced, perform following step, otherwise proceed to step n.		
		m. Neutral start switch (6)	Modify	Carefully remove two terminal studs by unscrewing them
		n. Two screws (4) and lock washers (5)	Install	In neutral start switch screw terminal holes
		o. Back-up alarm switch (3)	Install	
		p. Two detent balls (2) and detent springs (1)	Install	

4-4. TRANSMISSION MAINTENANCE (cont)

k. Modulation Valve Assembly.

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS

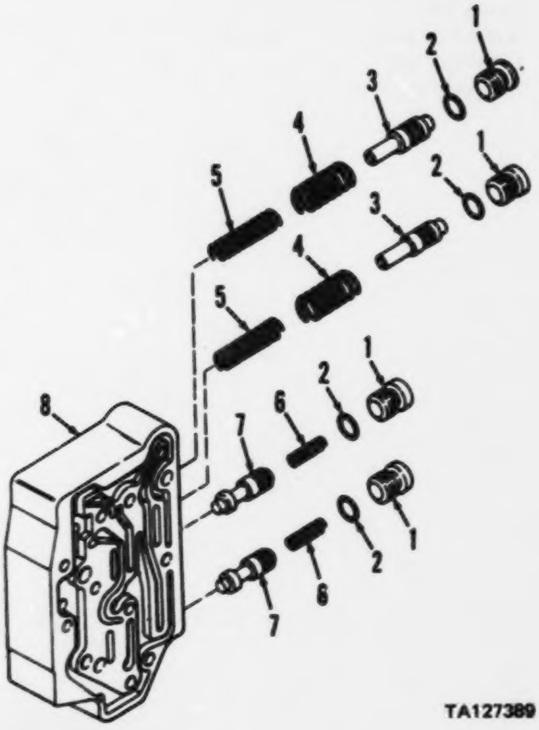
Automotive Mechanic's Tool Kit	NSN 5180-00-754-0641

MATERIALS/PARTS

Cleaning solvent P-D-680
Clean cloths
OE10 (refer to current lubrication order)
O-rings

EQUIPMENT CONDITION

Paragraph	Condition Description
3-19d	Modulation valve assembly removed from transmission.



KEY

1. Piston seals
2. O-rings
3. Accumulator valves
4. Outer accumulator springs
5. Inner accumulator springs
6. Regulator springs
7. Regulator spools
8. Modulation valve body

4-4. TRANSMISSION MAINTENANCE (cont)

k. Modulation Valve Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Modulation valve body (8)	a. Four piston seals (1)	Remove	
		b. Four O-rings (2)	Remove and discard	
		c. Two accumulator valves (3)	Remove	
		d. Two outer accumulator springs (4)	Remove	
		e. Two inner accumulator springs (5)	Remove	
		f. Two regulator springs (6)	Remove	
		g. Two regulator spools (7)	Remove	
CLEANING				

WARNING

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WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
2		All parts	Clean	Use cleaning solvent P-D-680. Immerse parts in cleaning solvent and move slowly up and down until parts are thoroughly cleaned. Dry parts thoroughly using compressed air or clean cloths
INSPECTION				
3		Modulation valve body (8)	Inspect	Replace if worn, damaged or distorted, or if spool bores cracked or worn

4-4. TRANSMISSION MAINTENANCE (cont)

k. Modulation Valve Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)				
4		Accumulator valves (3) and regulator spools (7)	Inspect	Replace if damaged, cracked, worn or distorted
5		Piston seals (1)	Inspect	Replace if worn, damaged or distorted, or if threads cracked or pitted
6		Outer accumulator springs (4), inner accumulator springs (5), regulator springs (6)	Inspect	Replace if worn, damaged, cracked, distorted or permanently set
REASSEMBLY				
7	Modulation valve body (8)	a. Two regulator spools (7)	Install	
		b. Two regulator springs (6)	Install	
		c. Two inner accumulator springs (5)	Install	
		d. Two outer accumulator springs (4)	Install	
		e. Two accumulator valves (3)	Install	
		f. Four O-rings (2)	Install	Lubricate with OE10 (refer to current lubrication order)
		g. Four piston seals (1)	Install	

4-5. AXLE MAINTENANCE

a. Differential Carrier.

This task covers repair of the differential carrier consisting of:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly
e. Adjustment

INITIAL SETUP

TOOLS

Field Maintenance Supplemental Tool Set No. 2
NSN 4910-00-754-0707

Shop Equip Machine Shop, Field Maint, Basic
NSN 3470-00-754-0708

Bar, two inches diameter, 6 feet long
Yoke Holding Tool
Arbor press, 1/2 ton capacity
Automotive Mechanic's Tool Kit NSN 5180-00-754-0641
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654

MATERIALS/PARTS

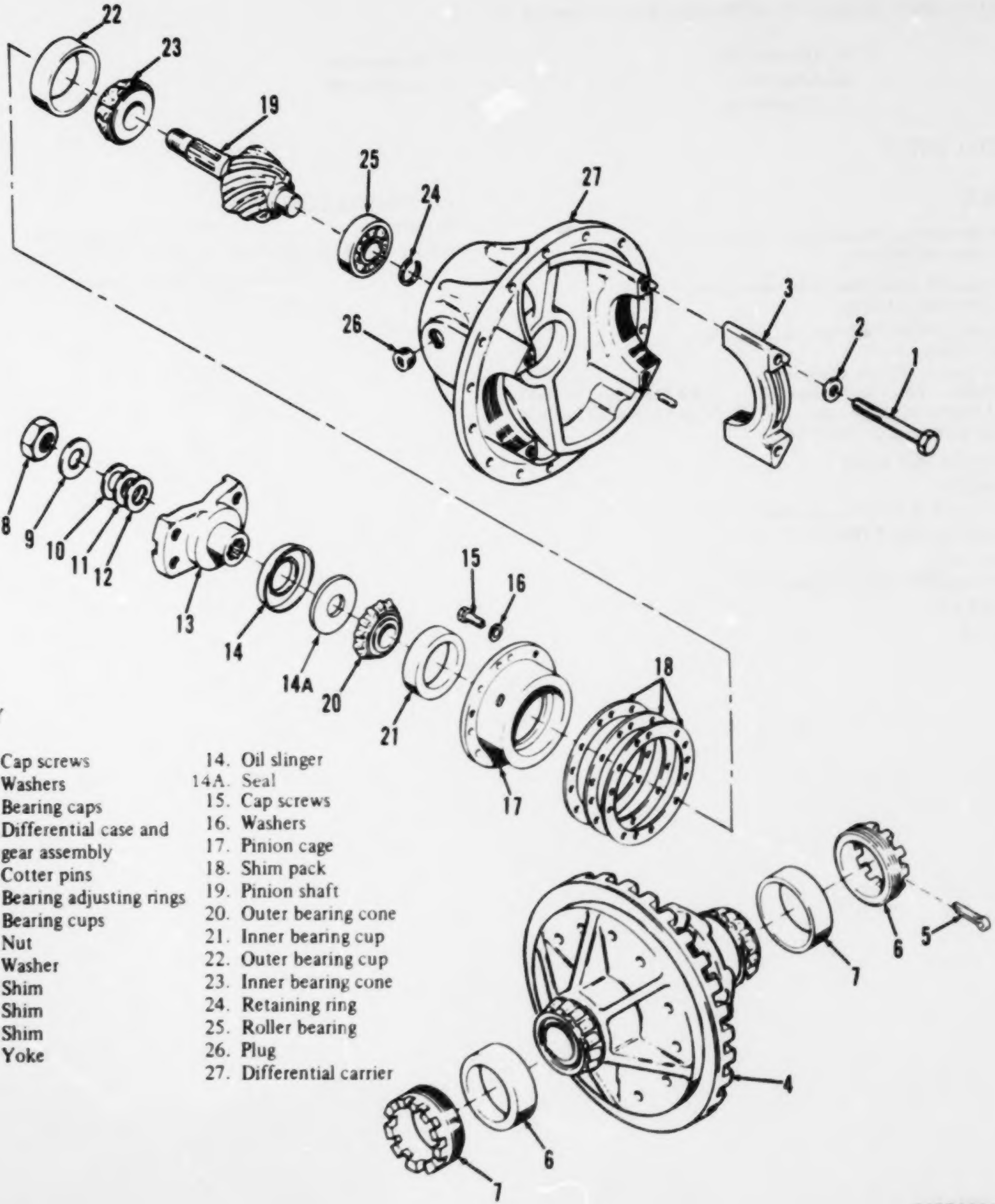
Crocus cloth
Two 3/8-16 X 2 NC cap screws
Cleaning solvent P-D-680
Clean cloths
Red lead (NSN 8010-00-243-9265)
Linseed oil
Light oil

EQUIPMENT CONDITION

Paragraph	Condition Description
3-20c, 3-20d	Differential carrier removed from axle. Differential carrier mounted in carrier repair stand.

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).


22
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KEY

1. Cap screws
2. Washers
3. Bearing caps
4. Differential case and gear assembly
5. Cotter pins
6. Bearing adjusting rings
7. Bearing cups
8. Nut
9. Washer
10. Shim
11. Shim
12. Shim
13. Yoke
14. Oil slinger
14A. Seal
15. Cap screws
16. Washers
17. Pinion cage
18. Shim pack
19. Pinion shaft
20. Outer bearing cone
21. Inner bearing cup
22. Outer bearing cup
23. Inner bearing cone
24. Retaining ring
25. Roller bearing
26. Plug
27. Differential carrier

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4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Differential case and gear assembly (4)	Ring gear	Measure backlash	Record for reassembly; refer to adjustments, step 25
2	Differential carrier (27)	a. Bearing cap (3)	Mark	Center punch bearing cap (3) and one differential carrier leg for reference at reassembly
		b. Four cap screws (1) and washers (2)	Remove	
		c. Two bearing caps (3)	Remove	
		d. Differential case and gear assembly (4)	Remove	Insert bar through differential case and gear assembly (4) to remove; lift unit out
		e. Two cotter pins (5)	Remove	
		f. Two bearing adjusting rings (6)	Remove	
		g. Two bearing cups (7)	Remove	
		NOTE To repair differential case and gear assembly, refer to paragraph 4-5b.		
3	Pinion shaft (19)	a. Nut (8)	Remove	Use tool to hold yoke
		b. Washer (9)	Remove	
		c. Shims (10, 11, and 12)	Remove	
4	Yoke (13)	Oil slinger (14)	Remove	
5	Pinion cage (17)	a. Eight cap screws (15) and washers (16)	Remove	
		b. Pinion cage (17)	Remove	Install two 3/8-16 X 2 NC cap screws in pinion cage puller holes. Turn each screw equally to prevent damage to differential carrier, pinion shaft, or bearings
		c. Shim pack (18)	Remove	Wire shims together
		d. Pinion shaft (19)	Remove	Tap pinion shaft out of pinion cage (17) using soft mallet or press from pinion cage
		e. Outer bearing cone and seal (14A)	Remove	From pinion cage
		f. Inner bearing cup (21)	Remove	Press from pinion cage
		g. Outer bearing cup (22)	Remove	Press from pinion cage

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY (cont)				
6	Pinion shaft (19)	a. Inner bearing cone (23)	Remove	Use puller to remove from pinion shaft
		b. Retaining ring (24)	Remove	
		c. Roller bearing (25)	Remove	Use puller to remove from pinion shaft
7	Differential carrier (27)	Plug (26)	Remove	
CLEANING				

WARNING

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STEP	LOCATION	ITEM	ACTION	REMARKS
8		Bearings (20, 23, and 25)	Clean	Use cleaning solvent P-D-680; soak in cleaning solvent then remove and strike flat of bearing against block of wood to dislodge solidified lubricant particles. Dry with clean, soft, lintless, absorbent cloths. Don't use compressed air to dry bearings

CAUTION

Don't immerse differential case and gear assembly (4) in cleaning solvent.

NOTE

If differential case and gear assembly has been repaired as described in paragraph 4-5b don't perform following step.

STEP	LOCATION	ITEM	ACTION	REMARKS
9		Differential case and gear assembly (4)	Clean	Use clean, soft, lintless, absorbent cloth moistened with cleaning solvent P-D-680 to remove dirt and lubricant

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
10		All other parts		Use cleaning solvent P-D-680. Dry with clean, soft, lintless, absorbent cloths
INSPECTION				
11		Bearings (20, 23, and 25), bearing cups (7, 21, and 22)	Inspect	Check for wear, pitting, or damage; replace part if any of these conditions are observed
12		Pinion shaft (19)	Inspect	Check gear teeth and splines for nicked, cracked, broken, scored, or worn condition. Remove burrs or nicks with soft hone or crocus cloth. Replace badly damaged or worn part

NOTE

Pinion shaft (19) and ring gear (para 4-5b, key number 16) shall be replaced as a matched set.

STEP	LOCATION	ITEM	ACTION	REMARKS
13		Bearing adjusting ring (6)	Inspect	Check for wear, damage and nicks. Check threads for damage. If any of these conditions are observed, replace part
14		Pinion cage (17) and differential carrier (27)	Inspect	Check for cracks, breaks, burrs, and damage to machined surfaces. Remove burrs and minor surface irregularities with soft hone or crocus cloth. Replace cracked or damaged parts
15		Yoke (13)	Inspect	Check for cracks, burrs, twisted splines, and other damage. Remove burrs with soft hone or crocus cloth. Replace part if cracked or splines badly twisted
16		All other parts	Inspect	Check for damage and wear; replace part if damaged or worn

NOTE

Immediately after performing inspection, coat all parts with light oil to prevent corrosion.

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY				
17	Differential carrier (27)	Plug (26)	Install	
18	Pinion shaft (19)	a. Roller bearing (25)	Install	Press onto pinion shaft (19)
		b. Retaining ring (24)	Install	Secures roller bearing
		c. Inner bearing cone (23)	Install	Press onto pinion shaft
19	Pinion cage (17)	a. Outer bearing cup (22)	Install	Press firmly against pinion cage shoulder. Lubricate with light oil
		b. Inner bearing cup (21)	Install	Press firmly against pinion cage shoulder. Lubricate with light oil
		c. Pinion shaft (19)	Position	In pinion cage
		d. Outer bearing cone and seal (14A)	Install	Press onto pinion shaft (19)
20	Differential carrier (27)	a. Shim pack (18)	Position	Use original shim pack or equivalent thickness
		b. Pinion cage (17)	Position	On differential carrier
		c. Eight washers (16) and cap screws (15)	Install	Tighten to 60-75 pounds foot torque
21	Yoke (13)	Oil slinger (14)	Install	On yoke (13)
22	Pinion shaft (19)	a. Yoke (13)	Position	
		b. Shims (10, 11, and 12)	Install	
		c. Washer (9)	Position	
		d. Nut (8)	Install	Tighten to 300-400 pounds foot torque
23	Differential carrier (27)	a. Pinion shaft (19)	Check preload	Use inch-pound torque wrench at nut (8) to check bearing preload. Correct bearing preload is 5 to 15 pounds inch. If torque is not within these limits, remove pinion cage (17) and add shims (18) to decrease preload or remove shims to increase preload
		b. Two bearing caps (3)	Position	
		c. Four washers (2) and cap screws (1)	Install	Tighten to 160-190 pounds foot torque
		d. Two bearing cups (7)	Check	Check that bearing cups can be pushed in bores by hand; if necessary, rework bores using emery cloth until hand push fit is obtained. After hand push fit is obtained, remove cap screws (1) and bearing cap (3)

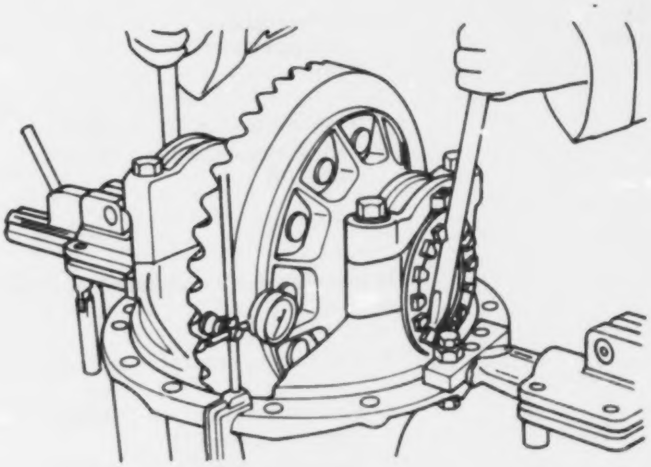
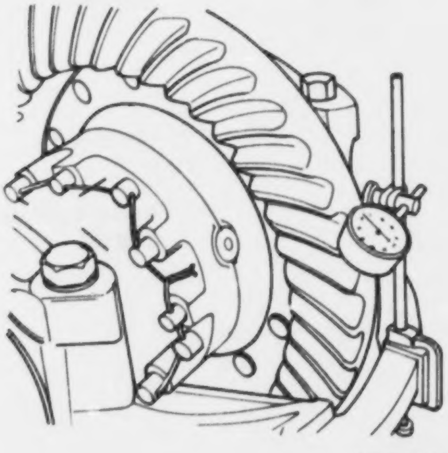
4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
REASSEMBLY (cont)				
23 (cont)		e. Differential case and gear assembly (4)	Position	Position differential carrier (27) to accept unit; insert bar through differential case and gear assembly and position it onto differential carrier
		f. Two bearing cups (7)	Position	On lift bar
		g. Two bearing adjusting rings (6)	Position	On lift bar; raise bar to install bearing cup (7) and adjusting ring on differential case and gear assembly (4)
		CAUTION In following step, be careful not to cross thread bearing adjusting rings (6).		
		h. Two bearing caps (3)	Position	Align match marks on cap and carrier (27) leg
		i. Four washers (2) and cap screws (1)	Install	Tighten snugly; don't torque
		j. Two cotter pins (5)	Install	After performance of steps 24 through 26 of adjustments
		k. Four cap screws (1)	Tighten	To 160-190 pounds foot torque after performance of steps 24 through 26 of adjustments
ADJUSTMENTS				
24	Differential bearing preload	a. Bearing adjusting ring (6)	Tighten	Mount dial indicator as shown below. Loosen ring (6) on opposite side of gear only sufficient to notice end play on dial indicator. Then, tighten same ring only sufficiently to obtain zero end play
		b. Ring gear	Check runout	If runout exceeds 0.008 inch, remove differential case and gear assembly (4) and check cause
		c. Bearing adjusting ring (6)	Tighten	Tighten both rings one notch each from zero end play to preload differential bearings

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENTS (cont)				
24 (cont)				 TA127392
25	Ring gear backlash check	a. Ring gear	Check backlash	Mount dial indicator as shown. Ring gear backlash shall be as recorded in step 1 of disassembly. If necessary adjust as described below  TA032289

4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

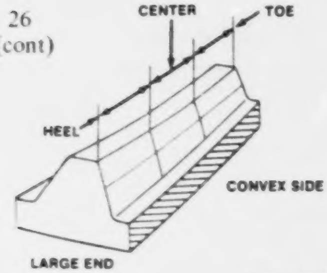
STEP	LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENTS (cont)				
25 (cont)		**NOTE** In following step, be sure to move each bearing adjusting ring (6) same distance to maintain bearing end play adjustment.		
		b. Bearing adjusting ring (6)	Loosen	Adjust backlash by backing off one adjusting ring (6) and advancing opposite ring same amount
		NOTE For new ring gear and pinion shaft, adjust backlash to 0.010 inch.		
26	Gear tooth contact check	Ring gear teeth	Paint	Use mixture of red lead and linseed oil. Rotate ring gear through one complete revolution in each direction. Compare toogh pattern against following. Adjust backlash to move ring gear or adjust pinion cage shim pack (18) to move pinion shaft as necessary to obtain correct tooth contact pattern

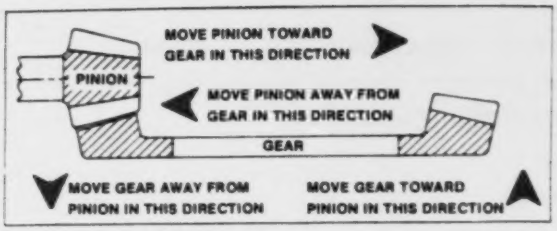
4-5. AXLE MAINTENANCE (cont)

a. Differential Carrier (cont).

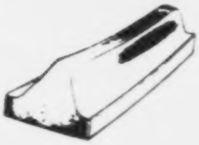
ADJUSTMENTS (cont)

26
(cont)


CENTER
TOE
HEEL
CONVEX SIDE
LARGE END

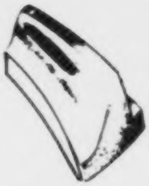

MOVE PINION TOWARD GEAR IN THIS DIRECTION
PINION
MOVE PINION AWAY FROM GEAR IN THIS DIRECTION
GEAR
MOVE GEAR AWAY FROM PINION IN THIS DIRECTION
MOVE GEAR TOWARD PINION IN THIS DIRECTION

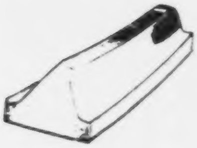
ALL CONTACT BEARINGS SHOWN BELOW ARE ON RIGHT HAND SPIRAL RING GEAR — THE DRIVE IS ON THE CONVEX SIDE OF THE TOOTH.



CONDITION 1

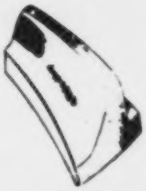
TYPICAL PREFERRED BEARING ON BOTH SIDES OF TOOTH WHILE UNDER A LIGHT LOAD

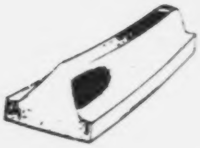




CONDITION 2

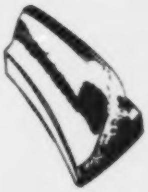
TOE BEARING ON BOTH SIDES OF TOOTH-GEAR SET NOISY. TO MOVE BEARING TOWARD HEEL INCREASE BACKLASH WITHIN LIMITS BY MOVING GEAR AWAY FROM PINION.

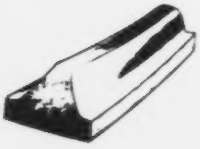




CONDITION 3

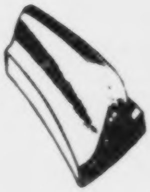
HEEL BEARING ON BOTH SIDES OF TOOTH-GEAR SET NOISY AND COULD RESULT IN EARLY GEAR FAILURE. TO MOVE BEARING TOWARD TOE DECREASE BACKLASH WITHIN LIMITS BY MOVING GEAR TOWARD PINION.

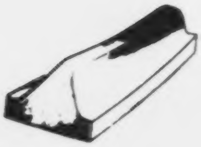




CONDITION 4

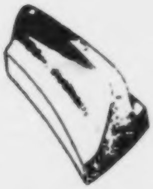
LOW BEARING ON GEAR AND HIGH BEARING ON PINION. CORRECT BY PULLING PINION AWAY FROM GEAR. INCREASE MOUNTING DISTANCE BY ADDING SHIMS BETWEEN BEARING CAGE AND DIFFERENTIAL HOUSING.





CONDITION 5

HIGH BEARING ON GEAR AND LOW BEARING ON PINION. CORRECT BY MOVING PINION IN TOWARD GEAR. DECREASE MOUNTING DISTANCE BY REMOVING SHIMS FROM BETWEEN BEARING CAGE AND DIFFERENTIAL HOUSING.



BACKLASH

BACKLASH SHOULD BE MEASURED WITH A DIAL INDICATOR RIGIDLY MOUNTED WITH THE STEM PERPENDICULAR TO THE TOOTH SURFACE AT THE EXTREME HEEL.

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4-5. AXLE MAINTENANCE (cont)

b. Differential Case and Gear Assembly.

This task covers repair of the differential case and gear assembly consisting of:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

TOOLS	
Electric Portable Drill	NSN 5130-00-889-9004
Arbor press 1/2 ton capacity	
No. 1 Common Organizational Maintenance Tool Kit	NSN 4910-00-754-0654

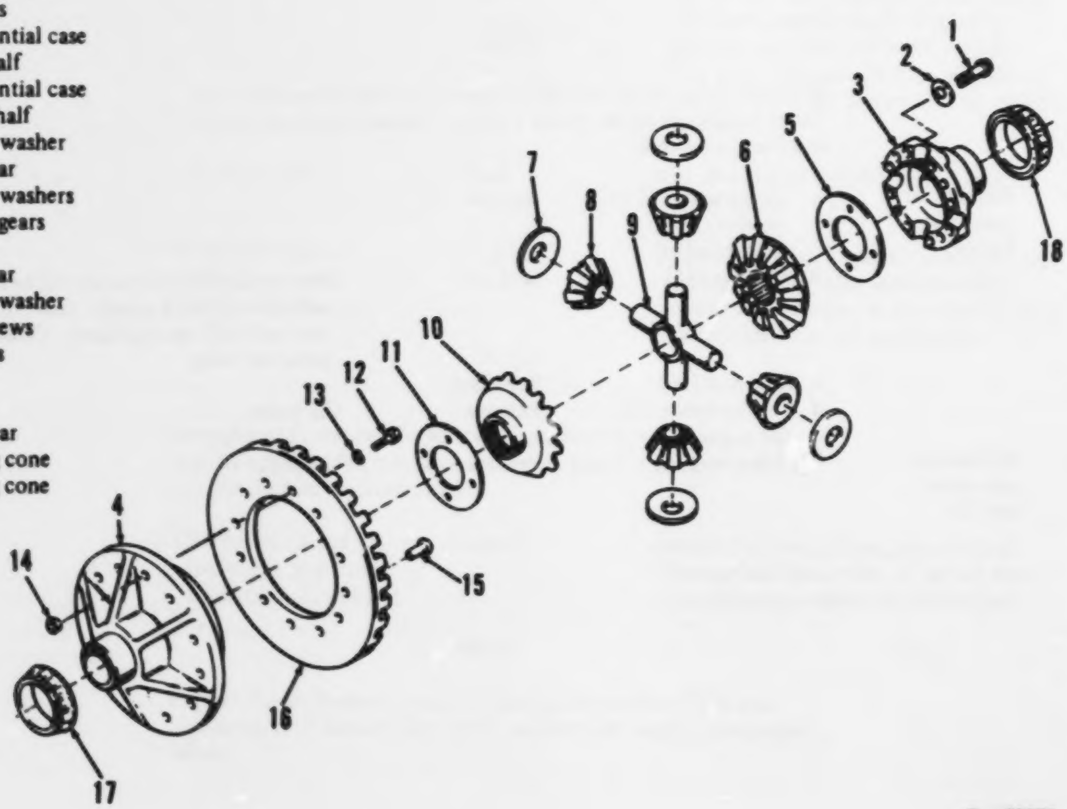
EQUIPMENT CONDITION

Paragraph	Condition Description
4-5a	Differential case and gear assembly removed from carrier.

MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths
Light oil
Axle lubricant (refer to current lubrication order)

KEY

1. Cap screws
2. Washers
3. Differential case plain half
4. Differential case flange half
5. Thrust washer
6. Side gear
7. Thrust washers
8. Pinion gears
9. Spider
10. Side gear
11. Thrust washer
12. Cap screws
13. Washers
14. Nuts
15. Rivets
16. Ring gear
17. Bearing cone
18. Bearing cone



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4-5. AXLE MAINTENANCE (cont)

b. Differential Case and Gear Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
DISASSEMBLY				
1	Differential case and gear assembly	a. Case halves (3 and 4)	Mark	Use punch or chisel to mark for correct alignment during reassembly
		b. Eight cap screws (1) and washers (2)	Remove	
		c. Differential case plain half (3), and flange half (4)	Separate	
		d. Thrust washer (5)	Remove	
		e. Side gear (6)	Remove	
		f. Four thrust washers (7)	Remove	
		g. Four pinion gears (8)	Remove	
		h. Spider (9)	Remove	
		i. Side gear (10)	Remove	
		j. Thrust washer (11)	Remove	
		NOTE If rivets (15) are used to secure ring gear (16) and differential case flange half (4), proceed to step b below; otherwise perform step a and disregard step b.		
2	Differential case flange half (4)	a. 12 cap screws (12), washers (13), and nuts (14)	Remove	
		b. 12 rivets (15)	Drill out	Center punch rivets in center of head. Use drill bit 1/32 inch smaller than body of rivet and drill through head. Carefully press out rivets
		c. Ring gear (16)	Remove	
		d. Bearing cone (17)	Remove	Use puller
3	Differential case plain half (3)	Bearing cone (18)	Remove	Use puller

4-5. AXLE MAINTENANCE (cont)

b. Differential Case and Gear Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING				

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

STEP	LOCATION	ITEM	ACTION	REMARKS
4		Bearings (17 and 18)	Clean	Use cleaning solvent P-D-680; soak in cleaning solvent then remove and strike flat of bearing against block of wood to dislodge solidified lubricant particles. Dry with clean, soft, lintless absorbent cloths. Don't use compressed air to dry bearings
5		All other parts	Clean	Use cleaning solvent P-D-680. Dry with clean cloths
6		Ring gear (16), side gear (6 and 10), and pinion gears (8)	Inspect	Inspect for wear, damage, cracks, pits and scoring. Inspect gear teeth for wear, cracks and damage. If any of these conditions are observed replace part

NOTE

Ring gear (16) and pinion shaft (paragraph 4-5a, key number 19) shall be replaced as a matched set. Pinion gear (8) and side gear (6 and 10) shall be replaced as a set.

STEP	LOCATION	ITEM	ACTION	REMARKS
7		Case halves (3 and 4), spider (9), and thrust washers (5, 7, and 11)	Inspect	Inspect for wear, cracks, pits, scoring, damage and distortion. If any of these conditions are observed, replace part

NOTE

Replace thrust washers (5 and 11) and thrust washer (7) in sets; combination of old and new thrust washers will result in premature failure.

4-5. AXLE MAINTENANCE (cont)

b. Differential Case and Gear Assembly (cont).

STEP	LOCATION	ITEM	ACTION	REMARKS
INSPECTION				
8		All other parts	Inspect	Inspect for wear, damage, cracks, pits and distortion. If any of these conditions are observed, replace part
		NOTE Immediately after performing inspection, coat all parts with light oil oil to prevent corrosion.		
REASSEMBLY		**NOTE** Lubricate all parts and differential case (3 and 4) inner walls with axle lubricant (refer to current lubrication order).		
9	Differential case flange half (4)	a. Ring gear (16)	Position	
		NOTE If rivets were used to secure ring gear and differential case flange half, use cap screw (12), washer (13) and nut (14) instead.		
		b. 12 washers (13), cap screws (12), and nuts (14)	Install	Tighten to 90-120 pounds foot torque
		c. Thrust washer (11)	Install	In case flange half (4)
		d. Side gear (10)	Install	In case flange half (4)
10	Spider (9)	a. Four pinion gears (8)	Install	On spider
		b. Four thrust washers (7)	Install	On pinion gears
11	Differential case flange half (4)	a. Spider (9), pinion gears (8), thrust washers (7)	Install	
		b. Side gear (6)	Install	
		c. Thrust washer (5)	Install	
		d. Differential case plain half (3)	Position	Align match marks
		e. Eight washers (2) and cap screws (1)	Install	Install four equally spaced and draw assembly together; check for free rotation of gears and correct if necessary. Install remaining cap screws (1) and washers (2). Tighten to 90-120 pounds foot torque
		f. Bearing cone (17)	Install	Press squarely and firmly
12	Differential case plain half (3)	Bearing cone (18)	Install	Press squarely and firmly

Section III. CHASSIS MAINTENANCE

This section contains general support maintenance procedures for the rear axle trunnion.

4-6. REAR AXLE TRUNNION

This task covers:
a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP

TOOLS
No. 1 Common Organizational Maintenance Tool Kit NSN 4910-00-754-0654
Hard Wooden Blocks (2), 6 by 6 by 18 inches

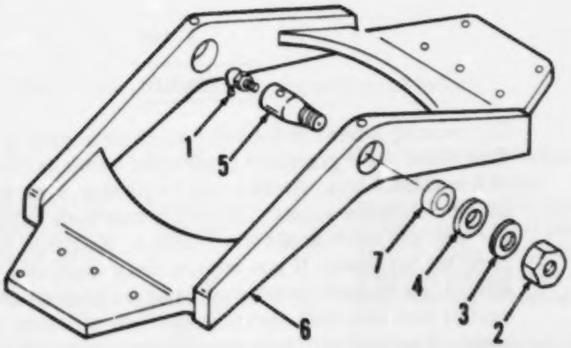
MATERIALS/PARTS
Cleaning solvent P-D-680
Clean cloths

EQUIPMENT CONDITION

Paragraph	Condition Description
	Vehicle parked on level surface, engine off, and front wheels blocked
2-4b(1)	Shipping lock pin installed.
2-39c	Rear drive shaft assembly disconnected from rear axle assembly differential companion yoke.
	Rear chassis raised (use chain hoist) and securely blocked.
2-47	Rear wheels and tires removed.
2-43b	Brake hoses and lines disconnected from rear axle housing and rear wheel cylinders.
3-20b	Rear axle housing removed from vehicle.

KEY

1. Grease fittings
2. Lock nuts
3. Small washers
4. Large washers
5. Pivot pins
6. Trunnion
7. Bushings



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4-6. REAR AXLE TRUNNION (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
REMOVAL				
1	Rear axle trunnion	a. Two grease fittings (1)	Loosen and remove	
		b. Trunnion (6)	Support	Use chain hoist with eyebolts to raise trunnion ends and relieve force on pivot pins (5)

WARNING

Be sure vehicle is securely blocked and chain hoist is securely attached to trunnion before performing following steps. Failure to do so could cause serious injury or death by equipment falling on you.

		c. Two lock nuts (2), small washers (3) and large washers (4)	Loosen and remove	If necessary, use chain wrench or pipe wrench on grease fitting end of pivot pin (5) to prevent pin from turning. Discard lock nuts (2)
		d. Two pivot pins (5)	Remove	Tap threaded end of pivot pin using brass drift and hammer
		e. Trunnion (6)	Lower and remove	

NOTE

Remove bushings (7) only if necessary for replacement.

		f. Two bushings (7)	Remove	Press from trunnion using rod that will contact outer race of bushing

CLEANING

WARNING

Dry cleaning solvent (P-D-680), used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat and don't smoke when using it. Failure to do so could cause serious injury. If you become dizzy while using cleaning solvent, get fresh air immediately, and get medical attention. If contact with skin or clothes is made, flush with large amounts of water. If contact with eyes is made, wash eyes with water immediately, and obtain medical aid immediately.

WARNING

Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes and possible blindness. If you hurt your eyes or if a foreign object is blown into your eyes, seek medical attention immediately.

4-6. REAR AXLE TRUNNION (cont)

STEP	LOCATION	ITEM	ACTION	REMARKS
CLEANING (cont)				
2		All parts	Clean	Use cleaning solvent P-D-680. Dry thoroughly with moisture free compressed air
INSPECTION				
3		Grease fittings (1) and pivot pins (5)	Inspect	Replace if cracked or broken, or if threads damaged
4		Washers (3 and 4) and bushings (7)	Inspect	Replace if scored, worn or damaged
5		Trunnion (6)	Inspect	Repair by welding if cracked or if welds broken. Replace if severely cracked or otherwise damaged
INSTALLATION				
6	Rear axle trunnion	a. Two bushings (7)	Install	Use rod that will contact outer race of bushing, and press bushing into pivot bore of trunnion until flush with surface of trunnion
		b. Trunnion (6)	Position	Use chain hoist with eye bolts to raise trunnion until holes in vehicle frame and trunnion are aligned

WARNING

Be sure vehicle is securely blocked and chain hoist is securely attached to trunnion before performing following steps. Failure to do so could cause serious injury or death by equipment falling on you.

NOTE

Make sure pivot pins (5) are clean and free of grease or oil before installation.

STEP	LOCATION	ITEM	ACTION	REMARKS
		c. Pivot pins (5)	Install	From inside of trunnion, insert pins through trunnion and frame
		d. Two large washers (4), small washers (3) and new lock nuts (2)	Install and tighten	Use chain wrench or pipe wrench on grease fitting end of pivot pin to prevent pin from turning. Tighten lock nuts (2) to 460-500 pounds foot torque
		e. Two grease fittings (1)	Install and tighten	Until securely mounted
		f. Two grease fittings (1)	Lubricate	Refer to current lubrication order

APPENDIX A
REFERENCES

A-1. Publication Indexes and General References

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

a. Military Publication Indexes.

Index of Administrative Publications	DA Pam 310-1
Index of Blank Forms	DA Pam 310-2
Index of Doctrinal, Training, and Organizational Publications	DA Pam 310-3
Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders	DA Pam 310-4

b. General References.

Dictionary of United States Army Terms	AR 310-25
Authorized Abbreviations and Brevity Codes	AR 310-50
Military Training Management	TC 21-5-7
How to Prepare and Conduct Military Training	FM 21-6
Military Symbols	FM 21-30

A-2. Other Publications

The following publications contain information pertinent to the major item materiel and associated equipment.

a. Vehicle.

Truck, Forklift, DED, Pneumatic Tire, Articulated Frame Steer, 4,000 lb. Capacity, Rough Terrain, Army Model MHE 237 (J. I. Case Model M4K)	LO 10-3930-638-12

b. Camouflage.

Camouflage	FM 5-20

c. Decontamination.

Chemical, Biological, and Radiological (CBR) Decontamination	TM 3-220
Chemical, biological, Radiological, and Nuclear Defense	FM 21-40

d. General.

Accident Reporting and Records	AR 385-40
Basic Cold Weather Manual	FM 31-70
Cooling Systems: Tactical Vehicles	TM 750-254
Manual for Wheeled Vehicle Driver	FM 21-305
Driver Selection and Training (Wheeled Vehicles)	FM 55-30
Mountain Operations	FM 90-6
Northern Operations	FM 31-71
Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F. to -65°F.)	FM 9-207
Principles of Automotive Vehicles	TM 9-8000
Prevention of Motor Vehicle Accidents	AR 385-55
Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use	TM 750-244-6

e. Maintenance and Repair.

Organizational Care Maintenance and Repair: Pneumatic Tires, Inner Tubes and Radial Tires	TM 9-2610-200-20
Description, Use, Bonding Techniques, and Properties of Adhesives	TB ORD 1032
Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materiels Including Chemicals	TM 9-247
Metal Body Repair and Related Operations	FM 43-2

A-2. OTHER PUBLICATIONS (cont)

Operation and Organizational, Maintenance Manual for Lead-Acid Storage Batteries	TM 9-6140-200-14
Organization, Policies, and Responsibilities for Army Materiel Maintenance Concepts and Policies	AR 750-1
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling System	TB 750-651
Welding Theory and Application	TM 9-237
Color, Marking, and Camouflage Painting of Military Vehicles Construction Equipment, and Materials Handling Equipment	TB 43-0209
f. *Shipment and Limited Storage.*	
Administrative Storage of Equipment	TM 740-90-1
Color Marking, and Preparation of Equipment for Shipment of Army Materiel	AR 746-1
Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army	SB 38-100
The Army Maintenance Management Systems (TAMMS)	DA PAM 738-750
g. *Army Oil Analysis Program*	
Army Oil Analysis Sampling Valves	TM9-2300-422-23&P

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in section II designates overall responsibility for the performance of maintenance functions on the identified component or assembly. The implementation of the maintenance functions upon the component or assembly will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment requirement for each maintenance function as referred from section II.

d. Section IV contains supplemental instructions or explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate); to preserve; to drain; to paint; or to replenish fuel, lubricants, or hydraulic fluid.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, setting, or fixing into position an item, component, or assembly in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable-like part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services[1] or other maintenance actions[2] to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. Overhaul. That maintenance effort (service/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

k. Rebuild. Consist of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. COLUMN ENTRIES USED IN THE MAC

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see para B-2.)

d. Column 4, Maintenance Catagory. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance functions at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different levels, appropriate "work time" figures will be shown for each level. The number of man-hours specified by the "work time" figures represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition. This time includes preparation time, troubleshooting time, and quality assurance/

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[1] Service – Inspect, test, service, adjust, align, calibrate, or replace.

[2] Action – Welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

B-3 COLUMN ENTRIES USED IN THE MAC (cont)

quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart.

The symbol designations for the various maintenance levels are:

C	Operator or crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall contain a letter code in alphabetic order which shall be keyed to the remarks contained in section IV.

B-4. COLUMN ENTRIES USED IN THE TOOL AND TEST EQUIPMENT REQUIREMENTS

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. Column 2, Maintenance Catagory. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN SECTION IV

a. Reference Code. The code scheme recorded in column 6, section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed as indicated on the MAC section II.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
01	ENGINE								
0100	Engine Assembly								
	Engine Assembly	Inspect	0.1						
		Service	0.5	1.5				1-3	
		Adjust			2.0			3, 4	
		Replace			8.0			3, 4	
		Repair				2.0		3, 4, 11, 12	
		Overhaul					50.0		
	Engine Mounts	Inspect			0.1				
		Replace			2.0			3, 4	
0101	Crankcase, Block Cylinder Head Cylinder Block	Inspect			0.1				
		Replace				50.0		3, 4	
		Repair				8.0		3, 4, 11, 12	
	Cylinder Head Assy	Inspect			0.1				
		Replace			1.5			3, 4	
		Repair			4.0			3, 4, 11, 12	
		Overhaul				4.0			
0102	Crankshaft	Inspect				0.3		3, 4	
		Replace				20.0		3, 4	
		Repair				8.0		3-4. 11, 12	
	Bearings, Main	Inspect				1.0		3, 4	
		Replace				6.0		3, 4	
0103	Flywheel Assy								
	Flywheel	Inspect		1.0					
		Replace				8.0		3,4	
		Repair				2.5		3, 4, 11, 12	
	Flywheel Housing	Inspect			0.5			3, 4	
		Replace				8.0		3, 4	
		Repair				2.0		3, 4, 11, 12	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
0104	Piston & Connecting Rods								
	Piston	Replace				16.0		3, 4	
		Repair				3.0		3, 4, 11, 12	
	Connecting Rod	Replace				16.0		3, 4	
		Repair				3.0		3, 4, 11, 12	
	Bearings, Connecting Rod	Inspect				1.0		3, 4	
		Replace				2.0		3, 4	
0105	Valves, Camshaft & Timing System								
	Rocker Arm Assy	Adjust			1.0			3, 4	
		Replace			2.0			3, 4	
		Repair			2.0			3, 4, 11, 12	
	Valves	Replace				8.0		3, 4	
		Repair				8.0		3, 4, 11, 12	
	Camshaft	Replace				12.0		3, 4	
	Timing Gears	Replace				12.0		3, 4	
0106	Engine Lubrication System								
	Oil Pan	Replace			3.0			3, 4	
		Repair			1.0			3, 4	
	Engine Oil Pump	Replace				6.0		3, 4	
		Repair				3.0		3, 4	
	Oil Filter	Replace		0.5				1-3	
0108	Manifolds								
	Manifolds, Intake & Exhaust	Inspect	0.1						
		Replace		0.7				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
	Spark Arrester	Replace		0.5				1-3	
03	FUEL SYSTEM								
0301	Fuel Injector	Test				1.0		9	
		Replace			2.5			1, 4, 7, 8	
		Repair				1.5		3, 4, 7, 8	
	Fuel Injector Lines	Inspect	0.2						
		Replace			1.0			1, 4, 7, 8	
0302	Fuel Pump & Lines								
	Fuel Injection Pump	Test		0.5					
		Replace			1.0			1, 4, 7, 8	
		Repair				2.0		1, 2, 4, 7, 8	
	Fuel Lines	Inspect	0.5						
		Replace		1.0				1, 2	
	Electric Fuel Pump	Test		0.5					
		Replace		1.0				1-3	
0304	Air Cleaner								
	Air Cleaner	Service		0.5				1, 2	
		Replace		0.5				1, 2	
0306	Tank, Lines, Fittings								
	Fuel Tank	Inspect	0.1						
		Service		0.3				1, 2	
0309	Fuel Filter								
	Fuel Filter	Service		0.5				1, 2	
		Replace		0.7				1, 2	
	Fuel Strainer	Inspect	0.1						
		Service		1.0				1, 2	
		Replace		1.5				1, 2	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
0311	Engine Starting Aids								
	Cold Start Kit	Inspect	0.1						
		Replace		1.0				1-3	
		Repair		0.5				1-3	
0312	Accelerator, Throttle Control								
	Throttle Control	Inspect	0.1						
		Adjust		0.5				1-3	
		Replace		0.5				1-3	
04	EXHAUST SYSTEM								
0401	Muffler and Pipe								
	Muffler and Pipe	Inspect	0.1						
		Replace		1.0				1-3	
05	COOLING SYSTEM								
0501	Radiator								
	Radiator Assy	Inspect	0.1						
		Service		0.2				1-3	
		Replace		2.0				1-3	
		Repair			3.0			3, 4	
0503	Water Manifold, Headers, Gasket								
	Thermostat & Housing	Test		0.1				1-3	
		Replace		0.5				1-3	
	Hoses, Lines & Fittings	Inspect	0.1						
		Replace		0.3				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
0504	Water Pump								
	Pump Assy	Inspect	0.1						
		Replace		1.5				1-3	
	Belt Drive	Inspect	0.1						
		Adjust		0.3				1-3	
		Replace		0.5				1-3	
0505	Fan Assembly								
	Fan	Inspect	0.1						
		Replace		1.0					
	Belt Drive	Inspect	0.1						
		Adjust		0.3				1-3	
		Replace		0.5				1-3	
06	ELECTRICAL SYSTEM								
0601	Alternator	Inspect	0.1						
		Test		0.5				1-3	
		Replace		1.5				1-3	
		Repair			1.0			1-3, 7, 8	
	Alternator Connections	Inspect	0.1						
		Test		0.5				1-3	
		Replace		1.5				1-3	
		Repair			1.0			3, 4, 7, 8	
	Drive Belt	Inspect	0.1						
		Adjust		0.3					
		Replace		0.5					
0603	Starting, Motor								
	Starter	Inspect		0.2					
		Test		0.5				1-3	
		Replace		0.5				1-3	
		Repair			1.0			1, 7, 8	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
	Solenoid	Inspect		0.1					
		Test		0.5				1-3	
		Repair			0.5			3, 4, 7, 8	
0607	Instrument or Engine Control Panel								
	Instrument Panel	Inspect	0.1						
		Repair		0.5				1-3	
	Hourmeter	Inspect	0.1						
		Replace		0.5				1-3	
0609	Lights								
	Front Floodlights	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
	Blackout Lights	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
	Taillights	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
	Blackout Taillights	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
	Rear Floodlights	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
0610	Sending Units & Warning Switches								
	Sending Unit Oil Pressure	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
	Sending Unit Engine Temperature	Inspect	0.1						
		Test		0.1				1, 2	
		Replace		0.5				1-3	
0611	Horn								
	Horn	Test	0.1						
		Replace		0.5				1, 2	
	Horn Switch	Test	0.1						
		Replace		0.5				1, 2	
0612	Batteries, Storage								
	Batteries	Inspect	0.1						
		Test	0.3						
		Service	0.3						
		Replace		1.0				1, 2	
	Battery Cables	Inspect	0.1						
		Replace		0.3				1-3	
		Repair		0.5				1-3	
0613	Hull or Chassis Wiring Harness								
	Wiring Harness	Inspect	0.1						
		Test		0.5				1-3	
		Replace			2.5			3, 4, 7, 8	
		Repair		1.0				2, 3, 7, 8	
07	TRANSMISSION								
0708	Torque Converter or Fluid Coupling								
	Hose, Line & Fittings	Inspect		0.1				1, 2	
		Replace		0.5				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
0710	Transmission Assy								
	Transmission	Test			0.5			3, 4	
		Inspect		0.2				1-3	
		Service		0.5				1-3	
		Replace			8.0			3-5	
		Repair				8.0		3–5	
		Overhaul					40.0		
0721	Coolers, Pumps, Motors								
	Transmission Linkage Controls	Inspect		0.1				1, 2	
		Adjust		0.5				1-3	
		Replace		1.0				1-3	
		Repair		0.5				1-3	
	Oil Pump	Replace			1.0			3, 4, 12	
		Repair				1.0		4, 5, 12	
	Control Valve	Inspect		0.1				1-3	
		Replace			1.0			3, 4	
		Repair				2.0		3, 4	
	Oil Filter	Service		0.3				1-3	
		Replace		0.5				1-3	
	Oil Cooler (Torque Converter)	Inspect	0.1						
		Replace		2.0				1-3	
		Repair			3.0			3, 4	
09	PROPELLER AND PROPELLER SHAFTS								
0900	Propeller Shafts								
	Front Drive Shaft	Service		0.1				1, 2	
		Replace		1.0				1-3	
		Repair		1.0				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
	Center Drive Shaft	Service		0.1				1, 2	
		Replace		1.0				1-3	
		Repair		1.0				1-3	
	Rear Drive Shaft	Service		0.1				1, 2	
		Replace		1.0				1-3	
		Repair		1.0				1-3	
10	FRONT AXLE								
1000	Front Axle Assy								
	Front Axle	Inspect		0.1				1, 2	
		Service		0.3				1-3	
		Replace			8.0			3, 4	
		Repair				4.0		3, 4, 12,18,19	
		Overhaul					8.0		
1002	Differential Assy								
	Differential Carrier Assy	Service		0.5				1-3	
		Replace			4.0			3, 4	
		Repair				4.0		3, 4, 11,18,19	
		Overhaul					8.0		
11	REAR AXLE								
1100	Rear Axle Assy								
	Rear Axle	Inspect		0.1				1, 2	
		Service		0.3				1-3	
		Replace			8.0			3, 4, 5	
		Repair				4.0		3, 4, 5, 12,18, 19	
		Overhaul					8.0		
1102	Differential Assy								
	Differential Carrier Assy	Service		0.5				1-3	
		Replace			4.0			3, 4	
		Repair				4.0		3, 4, 5, 12,18,19	
		Overhaul					8.0		

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
12	BRAKES								
1201	Hand Brake								
	Linkage	Inspect		0.5				1, 2	
		Adjust		0.5				1-3	
		Replace		1.0				1-3	
		Repair		1.0				1-3	
	Brake Assy	Inspect		0.5				1, 2	
		Replace		2.0				1-3	
		Repair		2.0				1-3	
1202	Service Brake	Inspect		0.5				1, 2	
		Replace		16.0	**0.8**			1-3	
1204	Hydraulic Brake System								
	Hydraulic Brake Valve	Inspect		0.1				1, 2	
		Replace		1.0				1-3	
		Repair		0.5				1-3	
	Lines, Fittings & Hoses	Inspect		0.1				1, 2	
		Replace		1.0				1-3	
13	WHEELS								
1311	Wheel Assembly	Inspect	0.1						
		Replace		0.8				1-3	
	Tires	Inspect	0.1						
		Service	0.3						
		Replace		1.0				1-3	
		Repair		1.0				1-3	
14	STEERING								
1407	Power Steering Gear Assembly (& Steering Column)	Replace			2.0			3, 4	
		Repair			3.0			3, 4	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
1410	Hydraulic Pump or Fluid Motor Assy								
	Hydraulic Pump	Replace		1.0				1-3	
		Repair			2.0			3, 4, 10	
1411	Hoses, Lines & Fittings								
	Hoses, Lines & Fittings	Inspect	0.1						
		Replace		0.5				1-3	
		Repair		0.5				1-3	
1412	Hydraulic Cylinders								
	Steering Cylinder	Inspect	0.1						
		Replace		1.0				1-3	
		Repair			1.0			3, 4, 10	
15	FRAME & TOWING ATTACHMENTS								
1501	Frame Assembly								
	Roll Over Protective Structure	Inspect	0.1						
		Replace		1.0				1-3	
				1.0					
1503	Pintle and Towbar	Inspect		0.1				1, 2	
		Repair		2.0				1-3	
18	BODY, CAB, HOOD AND HULL								
1801	Body, Cab & Hood								
	Body	Inspect	0.1						
		Repair			2.0			3, 4, 13, 14	
	Hood	Inspect	0.1						
		Replace		0.7				1-3	
		Repair			2.0			3, 4, 13, 14	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
1806	Upholstery Seats & Carpets								
	Seat	Adjust	0.1						
		Inspect	0.2						
		Replace		0.5				1-3	
24	HYDRAULIC LIFT COMPONENTS								
2402	Manifold and/or Control Valves								
	Control Valve	Test		0.2				1-3	
		Replace			1.5			3, 4	
		Repair			4.0			3, 4	
2403	Hydraulic Controls and/or Manual Controls								
	Controls, Levers & Linkages	Inspect	0.1						
		Replace		0.5				1-3	
		Repair		0.5				1-3	
2404	Tilt Cylinders and Tilt Crank								
	Cylinder Hydraulic Tilt	Inspect	0.1						
		Test		0.2					
		Replace			1.0			3, 4	
		Repair			1.5			3, 4, 10, 11, 12	
2405	Mast Column							1	
	Lifting Forks	Inspect	0.1						
		Replace		0.5				1-3	
	Lift Chains	Adjustment		0.5				1-3	
		Removal		0.5				1-3	
		Replace		0.5				1-3	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1)	(2)	(3)	(4)					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
	Mast Assembly	Replace			2.0			3, 4	
		Repair			4.0			3, 4, 11, 12, 13	
	Side Shift Cylinder	Test			0.2				
		Inspect		0.1				3, 4, 10	
		Replace			1.0			3, 4	
		Repair			1.5			3, 4, 10	
	Hydraulic Lift Cylinder	Inspect	0.1						
		Test		0.2				1-3, 10	
		Replace			1.5			3, 4	
		Repair			2.0			3, 4, 10, 12, 15	A
2406	Strainers, Filters, Lines and Fittings								
	Hose, Lines & Fittings	Inspect	0.1						
		Replace		0.5				1-3	
		Repair		0.5				1-3	
2407	Hydraulic Cylinders								
	Rotation Cylinder	Test			0.2			3, 4, 10	
		Inspect	0.1						
		Replace			1.0			3, 4	
		Repair			1.5			3, 4, 10	
2408	Liquid Tanks or Reservoirs								
	Hydraulic Reservoir	Inspect	0.1						
		Service		0.1				1-3	
		Replace		1.0				1-3	
		Repair		2.0				1-3	
47	GAGES (ELECTRIC)								
4702	Gages, Fuel Level and Oil Pressure	Inspect	0.1						
		Replace		0.5				1-3	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
		Unless otherwise noted, all maintenance functions can be accomplished with the tools contained in the following common tool sets		
1	O, F, H	Tool Kit Auto Maint: ORG Maint Common #1	4910-00-754-0654	LIN W32593
2	O, F, H	Tool Kit Auto Maint: ORG Maint Common #2	4910-00-754-0650	LIN W32730
3	O, F, H	Tool Kit Auto Mech: Light Weight	5180-00-177-7033	LIN W33004
4	F, H	Shop Equip, Auto Maint: Field Maint, Basic (SC 4910-95-CL-A31)	4910-00-754-0705	TZ4660
5	F, H	Tool Kit Master Mech: Equip Maint & Repair	5180-00-699-5273	LIN W45060
6	F, H	Wrench Set Socket: 3/4" Drive Hex Type	5130-00-357-5135	LIN Y75239
7	F, H	Tool Kit Automotive Fuel & Elec Sys Repair	4910-00-754-0655	LIN W32456
8	F, H	Shop Equip Fuel & Elec Sys Engine	4910-00-754-0714	T30414
9	F, H	Test Set DSL Inj	4910-00-317-8265	V73742
18	F, H	Field Maintenance Supplemental Tool Set No. 2	4910-00-754-0707	LIN T25756
19	F, H	Shop Equip Machine Shop, Field Maint, Basic	3470-00-754-0708	LIN T15644
10		Gauge, Hydraulic Pressure 0-3000 PS:	6685-00-983-8326	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS (cont)

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
11	F, H	Shop Equip Machine Shop	3740-00-754-0708	T15644
12	F, H	Tool Kit Machinist	5280-00-511-1950	W44512
13	F, H	Shop Equip Welding	3740-00-357-7268	T16714
14	F, H	Tool Kit Body & Fender Repair	5180-00-754-0643	W33680
15	F	Kit, Seal Installing P/N Cás 1704		
16	F	Spanner Wrench	5120-00-277-9076	
17	F	Spanner Wrench	5120-00-277-9077	

Section IV. REMARKS

Reference Code	Remarks
A	Kit, Seal Installing, P/N 1704 (special tool) required to install seal, P/N L36272, part of parts kit, Linear, P/N G107912

APPENDIX C
REPAIR PARTS AND SPECIAL TOOLS LIST

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APPENDIX C

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE

REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I. INTRODUCTION

1. Scope.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of organizational, direct support, and general support maintenance of the fork lift truck, 4000 lbs. capacity. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

2. General.

In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

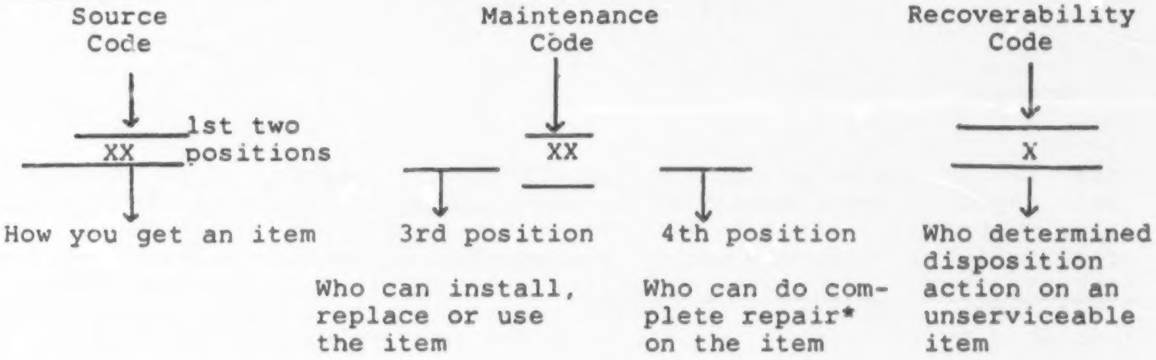
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

c. Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

3. Explanation of Columns (Sections II and III).

a. ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR CODE (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:


Source Code
XX
1st two positions
How you get an item
Maintenance Code
XX
3rd position
Who can install, replace or use the item
4th position
Who can do complete repair* on the item
Recoverability Code
X
Who determined disposition action on an unserviceable item

*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code. **NOTE: Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
MO-(Made at org/ AVUM Level) MF-(Made at DS/ AVUM Level) MH-(Made at GS Level) ML-(Made at Specialized Repair Act (SRA) MD-(Made at Depot)	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Code	Explanation
AO-(Assembled by org/AVUM Level) AF-(Assembled by DS/AVIM Level) AH-(Assembled by GS Category) AL-(Assembled by SRA) AD-(Assembled by Depot)	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.

XA - Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB - If an "XB" item is not available from salvage, order it using the FSCM and part number given.
XC - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD - Item is not stocked. Order an "XD"-coded item through normal supply channels using the FSCM and part number given, if no NSN is available.

NOTE: Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

Code	Application/Explanation
C	-Crew or operator maintenance done within organizational or aviation unit maintenance.
O	-Organizational or aviation unit category can remove, replace, and use the item.
F	-Direct support or aviation intermediate level can remove, replace, and use the item.
H	-General support level can remove, replace, and use the item.
L	-Specialized repair activity can remove, replace, and use the item.
D	-Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	-Organizational or aviation unit is the lowest level that can do complete repair of the item.
F	-Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H	-General support is the lowest level that can do complete repair of the item.
L	-Specialized repair activity (designate the specialized repair activity) is the lowest level that can do complete repair of the item.
D	-Depot is the lowest level that can do complete repair of the item.
Z	-Nonrepairable. No repair is authorized.
B	-No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item). However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability Codes	Application/Explanation
Z	-Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3rd position of SMR Code.
O	-Repairable item. When uneconomically repairable, condemn and dispose of the item at organizational or aviation unit level.
F	-Repairable item. When uneconomically repairable, condemn and dispose of the item at the direct support or aviation intermediate level.

Recoverability Codes	Application/Explanation
H	-Repairable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
D	-Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	-Repairable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	-Item requires special handling of condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. FSCM (Column (3)). The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. PART NUMBER (Column (4)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE: When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. DESCRIPTION AND USABLE ON CODE (UOC) (Column (5)). This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The physical security classification of the item is unclassified.

(3) Items that are included in kits and sets are listed below the name of the kit or set.

(4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).

(7) The usable on code, when applicable (see paragraph 5, Special Information).

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipment supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

f. QTY (Column (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

4. Explanation of Columns (Sect. IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

(1) STOCK NUMBER column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last digits of the NSN (i.e., $\overbrace{\text{5305-}\underbrace{\text{01-674-1467}}_{\text{NIIN}}}^{\text{NSN}}$). When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) FIG. column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. PART NUMBER INDEX. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) FSCM column. The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and FSCM columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III.

(5) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

5. Special Information. Use the following subparagraphs as applicable:

a. USABLE ON CODE. The usable on code appears in the lower left corner of the Description column heading. Usable on codes are shown as "UOC: . . . ." in the Description Column (justified left) on the first line applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes used in the RPSTL are:

Code	Used On
PAA	Model M114
PAB	Model M114A
PAC	Model M114B

(These codes and model numbers are examples only.)

b. FABRICATION INSTRUCTIONS. Bulk materials required to manufacture items for listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source codes to be manufactured or fabricated are found in manual # TM10-3930-638-24&P.

c. ASSEMBLY INSTRUCTION. Detailed assembly instructions are items source coded to be assembled from component spare/repair parts are found in # TM10-3930-638-24 and P manual. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. KITS. Line item entries for repair parts kits appear in a group in Section II (see table of contents).

e. INDEX NUMBERS. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

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f. ASSOCIATED PUBLICATIONS. The publication(s) listed below pertain to fork lift truck, 4000 lbs. capacity, and its components:

Publication	Short Title
________	________

NOTE: Associated publications shall not be listed here in combined narrative and RPSTL manuals.

g. ILLUSTRATIONS - LISTING. The illustrations in this RPSTL are identical to those published TM10-3930-638-24&P technical manual. Only those parts codes "C" or "O" in the third position of the SMR Code are listed in the tabular listing; therefore, there may be a break in the item number sequence. Only illustrations containing organizational or aviation unit authorized items appear in this RPSTL.
NOTE: The above statements shall appear in organizational or aviation unit level RPSTL's only.

6. How to Locate Repair Parts

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) Fifth. Refer to the Part Number Index to find the NSN, if assigned.

b. When National Stock Number or Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see 4.1(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4.b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) Second. After finding the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

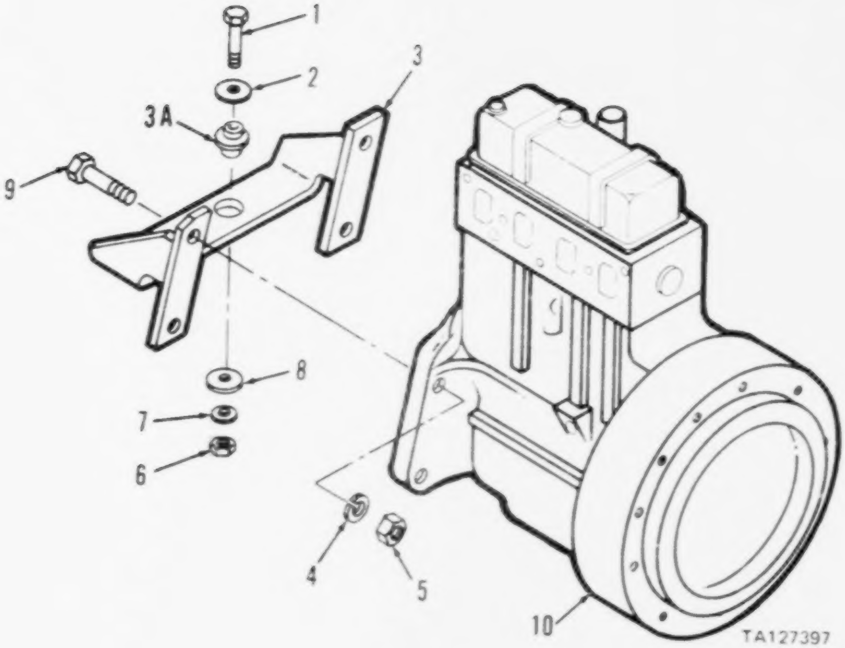
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Figure 1. Engine mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01 ENGINE GROUP 0100 ENGINE ASSEMBLY	
				FIG. 1 ENGINE MOUNTING	
1	PAFZZ	96906	MS90725-170	SCREW,CAP,HEXAGON H..................	1
2	PAFZZ	10988	D35009	WASHER,FLAT..........................	1
3	PAFZZ	10988	D63931	MOUNT ASSEMBLY,ENGN..................	1
3A	PAFZZ	10988	A59516	BUMPER,RUBBER........................	1
4	XDFZZ	96906	MS35338-50	WASHER,LOCK..........................	4
5	PAFZZ	96906	MS51967-20	NUT,PLAIN,HEXAGON....................	4
6	PAFZZ	96906	MS51922-49	NUT,SELF-LOCKING,HE..................	1
7	XDFZZ	10988	D43266	WASHER...............................	1
8	PAFZZ	10988	L78455	WASHER,FLAT..........................	1
9	PAFZZ	96906	MS90725-166	SCREW,CAP,HEXAGON H..................	4
10	PAFHD	10988	A154661	ENGINE,DIESEL........................	1

END OF FIGURE

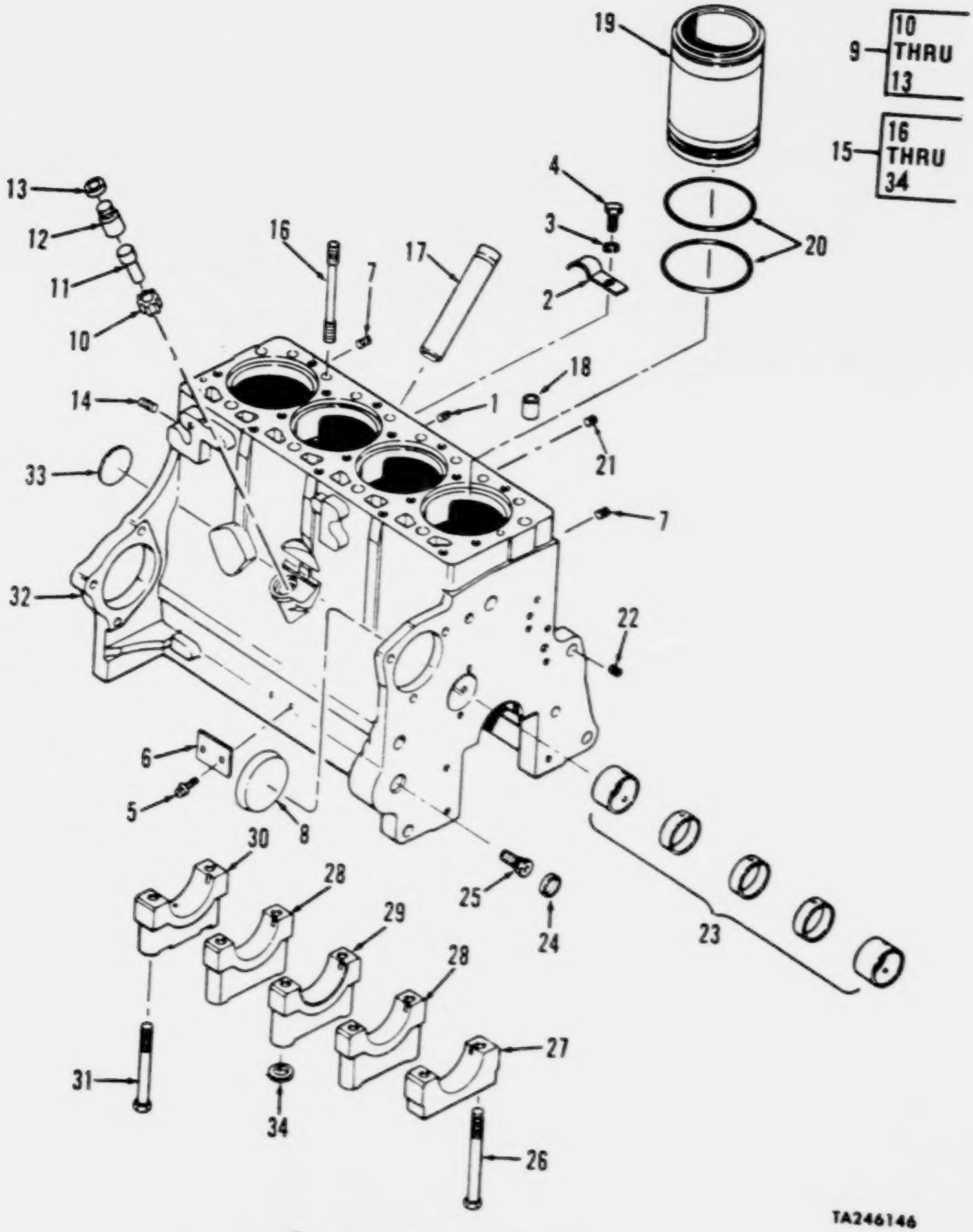
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Figure 2. Cylinder block assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0101 CRANKCASE,BLOCK,CYLINDER HEAD	
				FIGURE 2. CYLINDER BLOCK ASSEMBLY	
1	PAFZZ	10988	221-662	PLUG,PIPE DRAIN.....................	1
2	XBOZZ	10988	A26673	CLIP, FUEL SHUTOFF CABLE............	1
3	PAOZZ	96906	MS35338-44	WASHER,LOCK.........................	1
4	PAOZZ	96906	MS90725-3	SCREW,CAP,HEXAGON H.................	1
5	PAOZZ	96906	MS21318-27	SCREW,DRIVE.........................	2
6	XBOZZ	10988	321-4404	PLATE, SERIAL NO....................	1
7	XDFZZ	04808	360A632PC1	PLUG,PIPE GALLERY...................	2
8	PAHZZ	10988	41-1052	PLUG,EXPANSION......................	1
9	PAFZZ	10988	A154697	ADAPTER,SPEEDOMETER ASSEMBLY.......	1
10	XAFZZ	10988	A38943	.GEAR DRIVE.........................	1
11	XAFZZ	10988	A154699	.SHAFT, DRIVE.......................	1
12	XAFZZ	10988	A154698	.BODY...............................	1
13	XAFZZ	10988	A22553	.BUSHING............................	2
14	PAFZZ	34662	1604-187-Y	CAP,PROTECTIVE,DUST.................	1
15	XAHHH	10988	A152645	CYLINDER BLOCK ASSY.................	1
16	PAHZZ	10988	A36902	.STUD,PLAIN.........................	2
17	PAHZZ	10988	A37149	.FILLER NECK AND DIPSTICK..........	1
18	PAHZZ	10988	G49608	.BUSHING,SLEEVE.....................	2
19	XDHZZ	10988	A136474	.SLEEVE, CYLINDER PART OF KIT P/N A46382..............................	4
20	PAHZZ	10988	A51916	.PACKING,PREFORMED PART OF KIT P/N A46382 PART OF KIT P/N A46382.......	8
21	PAHZZ	10988	221-32	.PLUG,PIPE SOCKET PIPE.............	1
22	XDHZZ	10988	G49070	.PLUG,PIPE OIL GALLERY.............	1
23	PAHZZ	10988	A151075	.PARTS KIT,CAM BUSH CAMSHAFT.......	1
24	PAHZZ	96906	MS9176-20	.PLUG,EXPANSION FILTER FLANGE......	1
25	PAHZZ	10988	A37206	.ADAPTOR, OIL FILTER TO CYLINDER BLOCK...............................	1
26	PAHZZ	10988	26-882	.SCREW,CAP,HEXAGON H................	2
27	XBHZZ	10988	G2126	.CAP, MAIN BEARING FRONT...........	1
28	XBHZZ	10988	G2128	.CAP,MAIN BEARING INTERMEDIATE.....	2
29	XBHZZ	10988	G2127	.CAP,MAIN BEARING CENTER...........	1
30	XBHZZ	10988	A38385	.CAP, MAIN BEARING REAR............	1
31	PAHZZ	96906	MS90728-125	.SCREW,CAP,HEXAGON H................	8
32	XAHZZ	10988	A152625	.CYLINDER BLOCK.....................	1
33	XDHZZ	96906	MS9176-31	.PLUG, REAR,CAMSHAFT HOLE..........	1
34	XBHZZ	10988	G49404	.WASHER.............................	2

END OF FIGURE

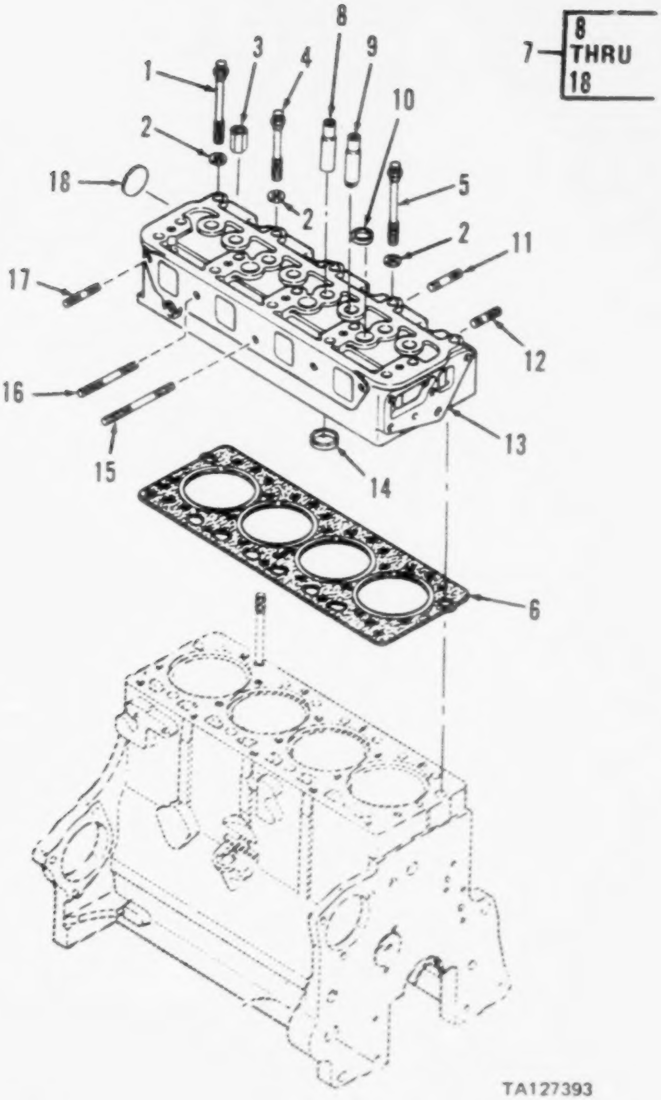
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Figure 3. Cylinder head

GROUP 0101 CRANKCASE,BLOCK,CYLINDER HEAD

FIG.3 CYLINDER HEAD

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAFZZ	10988	A39047	BOLT,MACHINE..........................	4
2	PAFZZ	10988	A39046	WASHER,FLAT...........................	19
3	PAFZZ	10988	A51114	POST,ELECTRICAL-MEC.................	2
4	PAFZZ	10988	A39049	BOLT,MACHINE..........................	2
5	PAFZZ	10988	A39048	BOLT,MACHINE..........................	11
6	KFFZZ	10988	A148745	GASKET, CYLINDER PART OF KIT P/N A155589................................	1
7	PAFHH	10988	A166029	CYLINDER HEAD ASSY...................	1
8	PAFZZ	10988	A152488	.GUIDE,ENGINE POPPET..................	4
9	PAFZZ	10988	A152489	.GUIDE,ENGINE POPPET VALVE..........	4
10	PAFZZ	96906	MS9176-20	.PLUG,EXPANSION........................	3
11	PAFZZ	10988	A39129	.STUD,PLAIN MANIFOLD, LONG..........	3
12	PAFZZ	10988	A29431	.STUD,PLAIN MANIFOLD, SHORT.........	2
13	XAFHH	10988	NSS	.CYLINDER HEAD.........................	1
14	PAFZZ	10988	A39268	.INSERTS,VALVE SEAT VALVE SEAT.....	4
15	PAFZZ	10988	A51500	.STUD,PLAIN MANIFOLD, CENTER.......	1
16	PAFZZ	10988	A153248	.STUD,PLAIN MANIFOLD................	2
17	PAFZZ	10988	A35175	.STUD,PLAIN MANIFOLD, END...........	2
18	PAFZZ	96906	MS9176-30	.PLUG,EXPANSION........................	1

END OF FIGURE

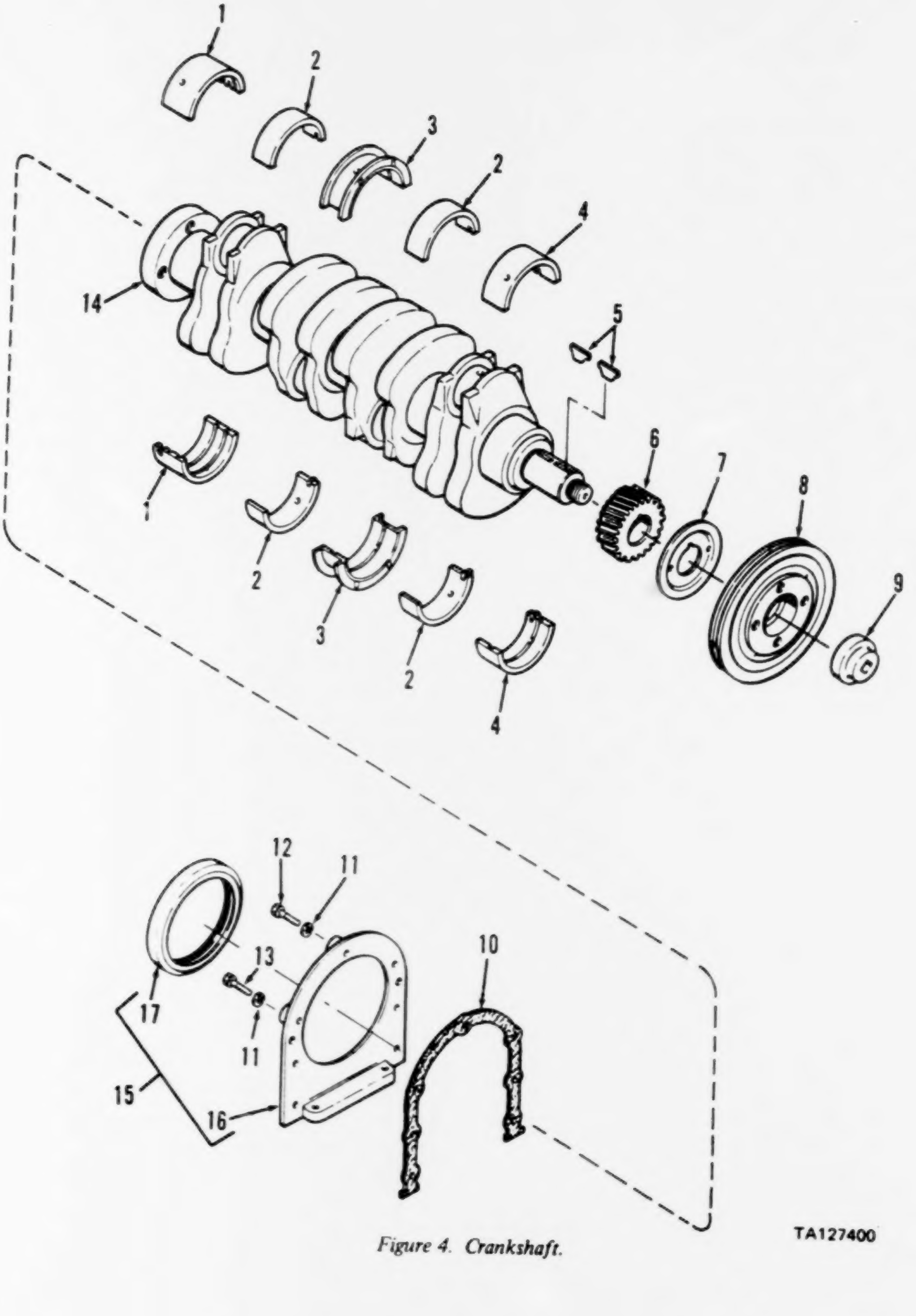
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Figure 4. Crankshaft.

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(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0102 CRANKSHAFT	
				FIG. 4 CRANKSHAFT	
1	PAHZZ	10988	A36495	BEARING HALF,SLEEVE..................	1
1	XDHZZ	10988	A36496	LINER KIT, MAIN .002 INCH...........	1
1	XDHZZ	10988	A36497	BEARING HALF,SLEEVE .010 INCH......	1
1	XDHZZ	10988	A36497	BEARING HALF,SLEEVE .020 INCH......	1
1	XDHZZ	10988	A36499	BEARING HALF,SLEEVE .030 INCH......	1
2	PAHZZ	10988	A36485	BEARING,SLEEVE......................	2
2	XDHZZ	10988	A36486	BEARING HALF,SLEEVE .002 INCH......	2
2	XDHZZ	10988	A36487	BEARING HALF,SLEEVE .010 INCH......	2
2	XDHZZ	10988	A36488	BEARING HALF,SLEEVE .020 INCH......	2
2	XDHZZ	10988	A36489	BEARING HALF,SLEEVE .030 INCH......	2
3	PAHZZ	10988	A36490	BEARING,SLEEVE......................	1
3	XDHZZ	10988	A36491	BEARING HALF,SLEEVE .002 INCH......	1
3	XDHZZ	10988	A36492	BEARING HALF,SLEEVE .010 INCH......	1
3	XDHZZ	10988	A36493	BEARING HALF,SLEEVE .020 INCH......	1
3	XDHZZ	10988	A36494	BEARING HALF,SLEEVE .030 INCH......	1
4	PAHZZ	10988	A36480	BEARING BRACKET.....................	1
4	XDHZZ	10988	A36481	BEARING HALF,SLEEVE .002 INCH......	1
4	XDHZZ	10988	A36482	BEARING HALF,SLEEVE .010 INCH......	1
4	XDHZZ	10988	A36483	BEARING HALF,SLEEVE .020 INCH......	1
4	XDHZZ	10988	A36484	BEARING HALF,SLEEVE .030 INCH......	1
5	PAHZZ	10988	A39132	KEY,WOODRUFF GEAR..................	2
6	XDHZZ	10988	A39288	GEAR,HELICAL.........................	1
7	XBHZZ	10988	A29259	SLINGER, OIL CRANKSHAFT............	1
8	PAHZZ	10988	A50962	PULLEY,GROOVE........................	1
9	PAHZZ	10988	A35673	NUT,CRANKSHAFT.......................	1
10	KBHZZ	10988	A39188	GASKET PART OF KIT P/N A43198.......	1
11	PAHZZ	96906	MS35338-44	WASHER,LOCK..........................	7
12	PAHZZ	96906	MS90728-6	SCREW,CAP,HEXAGON H.................	4
13	PAHZZ	96906	MS90728-8	SCREW,CAP,HEXAGON H.................	3
14	PAHZZ	10988	A144011	CRANKSHAFT,ENGINE....................	1
15	PAHHH	10988	A39113	SEAL,CRANKSHAFT CRANKSHAFT OIL SEAL	1
16	PAHZZ	10988	A38390	.RETAINER,PACKING SEAL..............	1
17	PAHZZ	10988	A39111	.SEAL,PLAIN ENCASED..................	1

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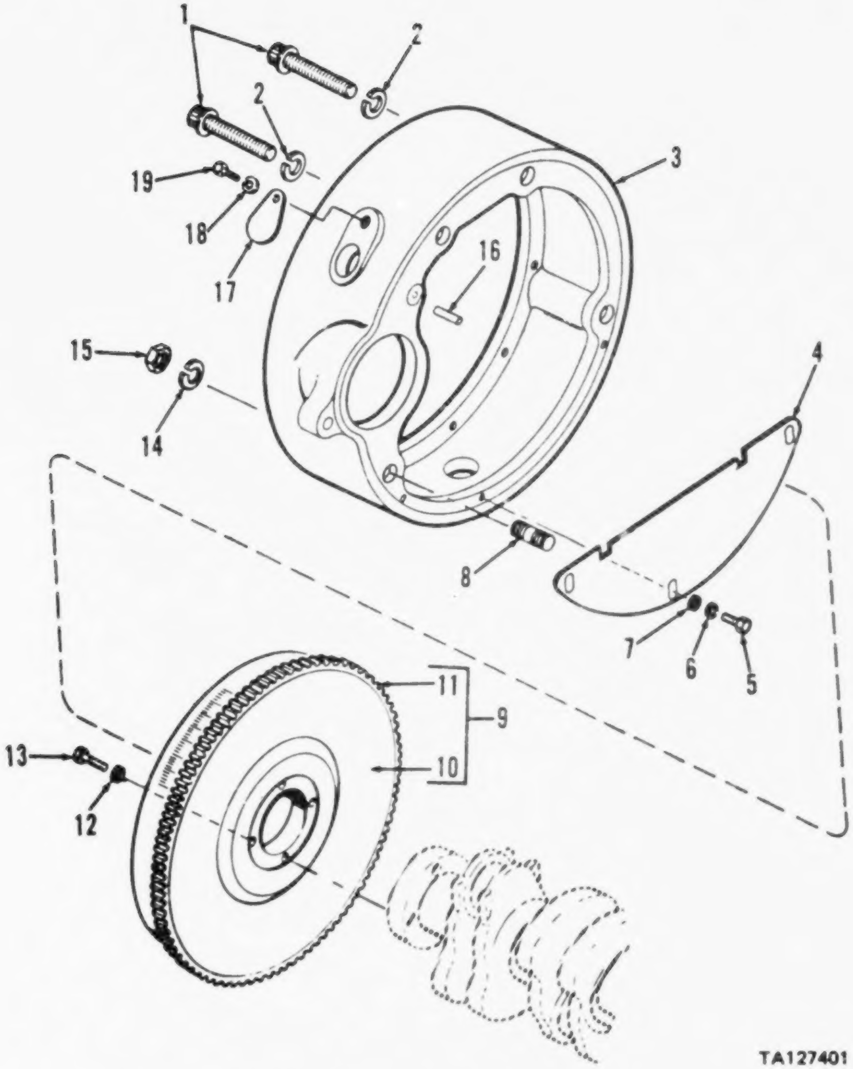
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Figure 5. Flywheel and housing.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0103 FLYWHEEL ASSEMBLY	
				FIG. 5 FLYWHEEL AND HOUSING	
1	XDHZZ	10988	A30135	BOLT,MACHINE	2
2	PAHZZ	96906	MS35335-39	WASHER,LOCK	2
3	PAHZZ	10988	A154662	HOUSING,MECHANICAL	1
4	XBHZZ	10988	G11716	COVER, DUST	1
5	PAHZZ	96906	MS90725-6	SCREW,CAP,HEXAGON H	3
6	PAHZZ	96906	MS35338-44	WASHER,LOCK	3
7	PAHZZ	96906	MS27183-11	WASHER,FLAT	3
8	XDHZZ	10988	A29363	STUD,PLAIN	2
9	PFHHH	10988	A154664	FLYWHEEL ASSEMBLY ASSEMBLE FROM PN-10988A154663	1
10	XAHZZ	10988	A154663	.FLYWHEEL	1
11	PAHZZ	10988	G11710	.GEAR,FLYWHEEL	1
12	PAHZZ	10988	A30013	WASHER,FLAT	4
13	PAHZZ	96906	MS90727-89	SCREW,CAP,HEXAGON H	4
14	PAHZZ	96906	MS35335-39	WASHER,LOCK	2
15	PAHZZ	96906	MS51968-20	NUT,PLAIN,HEXAGON	2
16	PAHZZ	96906	MS16562-39	PIN,SPRING	1
17	XBHZZ	10988	A29068	COVER, TIMING HOLE	1
18	PAHZZ	96906	MS35338-44	WASHER,LOCK	1
19	PAHZZ	96906	MS90725-3	SCREW,CAP,HEXAGON H	1

END OF FIGURE

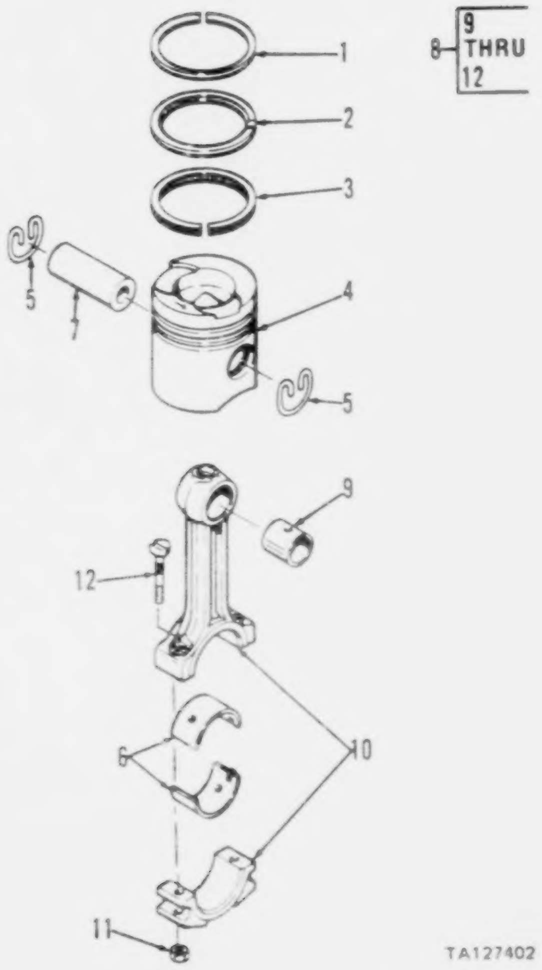
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Figure 6. Piston and connecting rods.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UDC)	(6) QTY
				GROUP 0104 PISTONS,CONNECTING RODS	
				FIG. 6 PISTON AND CONNECTING RODS	
1	KBHZZ	10988	A142982	RING, PISTON, TOP PART OF KIT P/N A151892 PART OF KIT P/N A46382......	4
2	KBHZZ	10988	A142350	RING, PISTON PART OF KIT P/N A151892 PART OF KIT P/N A46382.............	4
3	KBHZZ	10988	A138348	RING, PISTON, OIL PART OF KIT P/N A151892 PART OF KIT P/N A46382......	4
4	KBHZZ	10988	A151244	PISTON, 4-INCH BORE PART OF KIT P/N A46382.................................	4
5	KBHZZ	10988	G46702	RING, RETAINING PART OF KIT P/N A35771 PART OF KIT P/N A46382.......	8
6	PAHZZ	10988	A50975	BEARING HAFT,SLEEVE CONNECTING ROD BEARING, STANDARD..................	4
6	XDHZZ	10988	A50976	LINER KIT .002 INCH...............	4
6	XDHZZ	10988	A50977	LINER KIT .010 INCH...............	4
6	XDHZZ	10988	A50978	LINER KIT .020 INCH...............	4
6	XDHZZ	10988	A50979	LINER KIT .030 INCH...............	4
7	KBHZZ	10988	A35770	PIN, PISTON, PART PART OF KIT P/N A35771 PART OF KIT P/N A46382.......	4
8	PAHHH	10988	A51913	CONNECTING ROD,PIST.................	4
9	PAHZZ	10988	A136712	.SPACER,SLEEVE......................	1
				PACKING,PREFORMED (8) 2-20	
10	XAHZZ	10988	A51912	.CONNECTING ROD AND CAP............	1
11	PAHZZ	10988	A51904	.NUT,PLAIN,HEXAGON.................	2
12	PAHZZ	10988	A51914	.BOLT,CLOSE TOLERANC ROD...........	2

END OF FIGURE

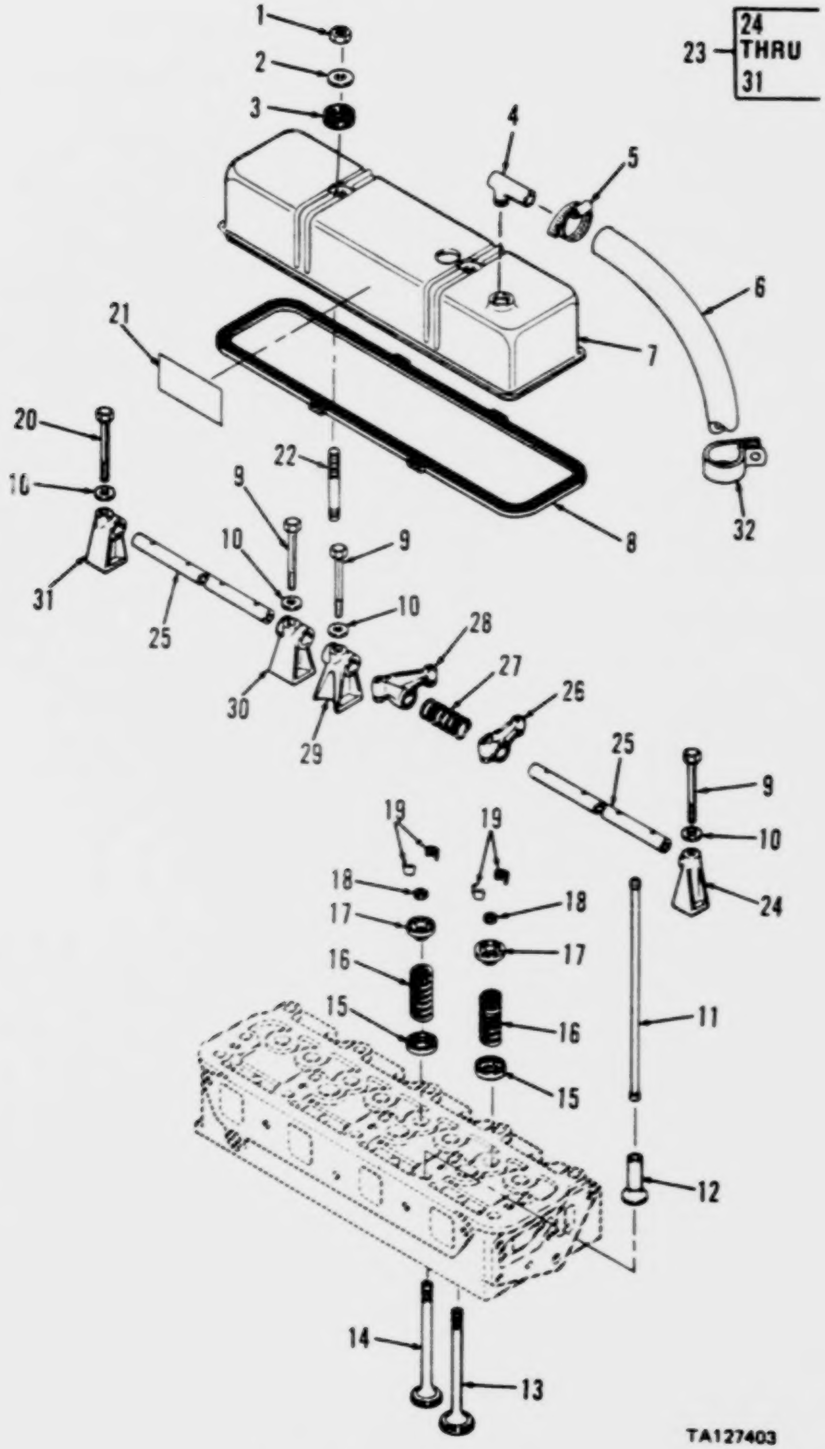
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Figure 7. Rocker arms and valves.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0105 VALVES,CAMSHAFTS,AND TIMING SYSTEM	
				FIG. 7 ROCKER ARMS AND VALVES	
1	PAFZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
2	PAFZZ	10988	G49400	WASHER,FLAT	2
3	PAFZZ	10988	A142098	GROMMET,METALLIC PART OF KIT P/N A155589	2
4	PAFZZ	10988	A9155	ELBOW,PIPE TO HOSE BREATHER	1
5	PAOZZ	00624	NH102300-0150	CLAMP,HOSE	1
6	MOOZZ	10988	L78902	HOSE,NONMETALLIC MAKE FROM P/N 1FBRBRDLPBLKSYNRBRHYDHSE3-4ID	1
7	PAFZZ	10988	A36815	COVER,ENGINE POPPET HEAD	1
8	PAFZZ	10988	A43030	GASKET PART OF KIT P/N A155589	1
9	PAFZZ	96906	MS90725-72	SCREW,CAP,HEXAGON H GASKET (8) 7-18	4
10	PAFZZ	15434	158208	WASHER	4
11	PAFZZ	10988	G47079	PUSH ROD,ENGINE POP	8
12	PAHZZ	71772	65-C-1604	TAPPET,ENGINE POPPE	8
13	PAFZZ	10988	A41726	VALVE SET	4
14	PAFZZ	10988	A41727	VALVE SET	4
15	XBFZZ	10988	G49065	WASHER,RECESSED	8
16	PAFZZ	10988	A30025	SPRING,HELICAL,COMP	8
17	XBFZZ	10988	G11717	RETAINER, SPRING	8
18	KFFZZ	10988	G46851	GASKET PART OF KIT P/N A155589 PART OF KIT P/N M20611	8
19	PAFZZ	10988	A30004	LOCK,VALVE SPRING R	16
20	PAFZZ	96906	MS90725-72	SCREW,CAP,HEXAGON H	1
21	XDFZZ	10988	321-5268	DECAL, ENGINE DATA	1
22	PAFZZ	10988	A51271	STUD,PLAIN	2
23	XBFFF	10988	G11883	.ROCKER ARM ASSEMBLY	1
24	PAFZZ	10988	G2100	..BRACKET,EYE,NONROTA FRONT	1
25	PAFZZ	10988	A38181	..SHAFT,STRAIGHT	2
26	PAFZZ	10988	A51148	..ROCKER ARM,ENGINE P	4
27	PAFZZ	10988	G48501	..SPRING,HELICAL,COMP	4
28	PAFZZ	10988	A51149	..ROCKER ARM,ENGINE P	4
29	PAFZZ	10988	A51084	..BRACKET,EYE,NONROTA INTERMEDIATE.	2
30	PAHZZ	10988	G2101	..BRACKET,EYE,NONROTA CENTER	1
31	PAFZZ	10988	A36615	..BRACKET,EYE,NONROTA REAR	1
32	PAOZZ	75272	CO-1813	CLAMP,LOOP	1
33	PAFZZ	10988	M20611	SEAL KIT	1

END OF FIGURE

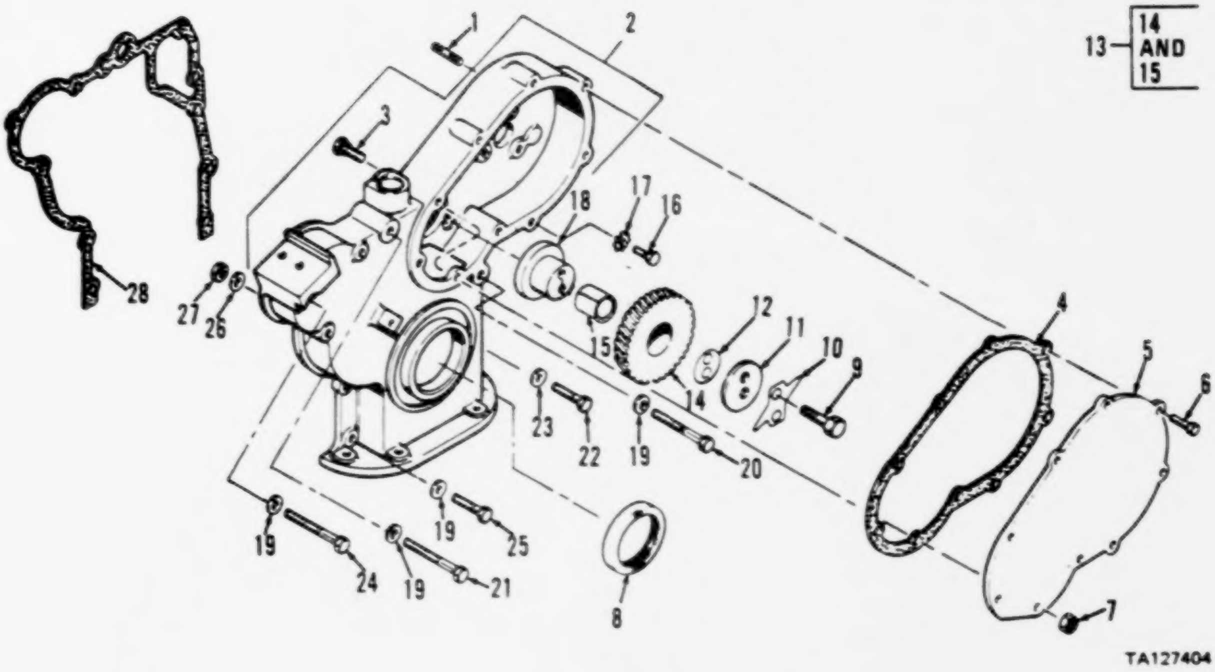
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Figure 8. Timing gear cover and idler gear.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0105 VALVES,CAMSHAFT,AND TIMING SYSTEM	
				FIG. 8 TIMING GEAR COVER AND IDLER GEAR	
1	PAHZZ	10988	G11204	STUD,PLAIN MOUNTING	3
2	XBHZZ	10988	A138245	COVER, TIMING GEAR	1
3	PAHZZ	10988	A51649	.STUD,SELF-LOCKING	2
4	PAHZZ	10988	A39925	GASKET PART OF KIT P/N A43198	1
5	PAHZZ	10988	A51908	COVER,ACCESS COVER	1
6	PAFZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H	7
7	PAHZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
8	PAFZZ	10988	A39110	SEAL,PLAIN ENCASED CRANKSHAFT	1
9	PAHZZ	96906	MS90725-66	SCREW,CAP,HEXAGON H	2
10	PAHZZ	10988	G11746	PLATE, LOCK	1
11	XDHZZ	10988	G11732	PLATE,THRUST	1
12	PAHZZ	10988	G11728	SHIM .005 INCH	1
12	PAHZZ	10988	G11729	SHIM .006 INCH	1
12	PAHZZ	10988	G11730	SHIM .007 INCH	1
12	PAHZZ	10988	G11731	SHIM .009 INCH	1
13	XDHZZ	10988	G11857	GEAR,SPUR	1
14	XAHZZ	10988	G11727	.GEAR, IDLER	1
15	XAHZZ	10988	G49660	.BUSHING, IDLER GEAR	1
16	PAHZZ	96906	MS18154-59	SCREW,CAP,HEXAGON H	2
17	PAHZZ	96906	MS35335-35	WASHER,LOCK	2
18	PAHZZ	10988	G11726	JOURNAL IDLER	1
19	PAHZZ	10988	A50820	WASHER,FLAT	9
20	PAHZZ	96906	MS90725-69	SCREW,CAP,HEXAGON H	1
21	PAHZZ	96906	MS90725-70	SCREW,CAP,HEXAGON H	1
22	PAHZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H	1
23	PAHZZ	96906	MS27183-15	WASHER,FLAT	1
24	PAHZZ	96906	MS51095-369	SCREW,CAP,HEXAGON H	3
25	PAHZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H	3
26	PAHZZ	96906	MS27183-14	WASHER,FLAT	3
27	PAHZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	3
28	KBHZZ	10988	A51529	GASKET,TIMING GEAR PART OF KIT P/N P/NA43198	1

END OF FIGURE

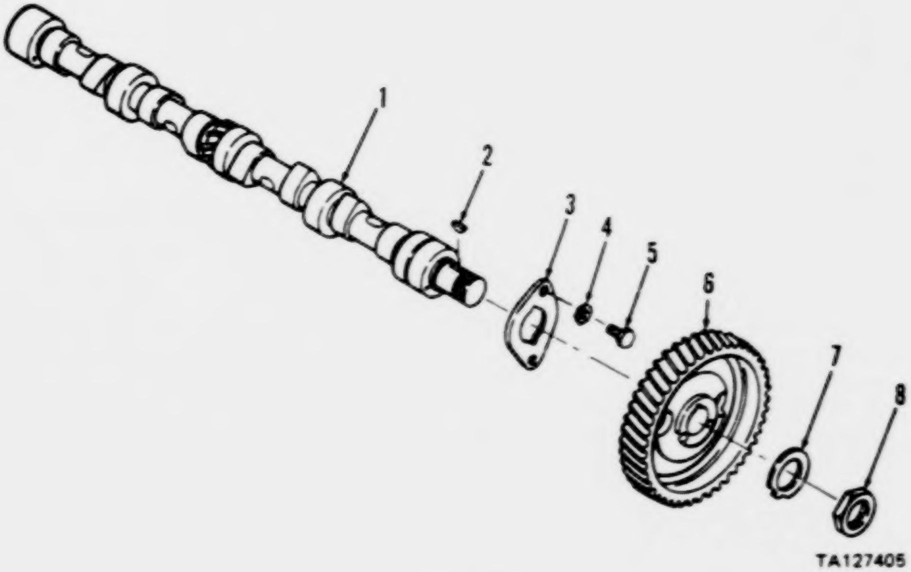
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Figure 9. Camshaft.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0105 VALVES,CAMSHAFT,AND TIMING SYSTEM	
				FIG. 9 CAMSHAFT	
1	PAHZZ	10988	A39013	CAMSHAFT,ENGINE......................	1
2	PAHZZ	96906	MS35756-9	KEY,WOODRUFF.........................	1
3	PAHZZ	10988	A29290	PLATE,THRUST CAMSHA CAMSHAFT.......	1
4	PAHZZ	96906	MS35335-34	WASHER,LOCK EXTERNAL TOOTH.........	2
5	PAHZZ	10988	A30056	BOLT,MACHINE.........................	2
6	PAHZZ	10988	A38931	GEAR,HELICAL.........................	1
7	PAHZZ	10988	A29438	WASHER,KEY...........................	1
8	PAHZZ	10988	A30063	NUT,CAMSHAFT.........................	1

END OF FIGURE

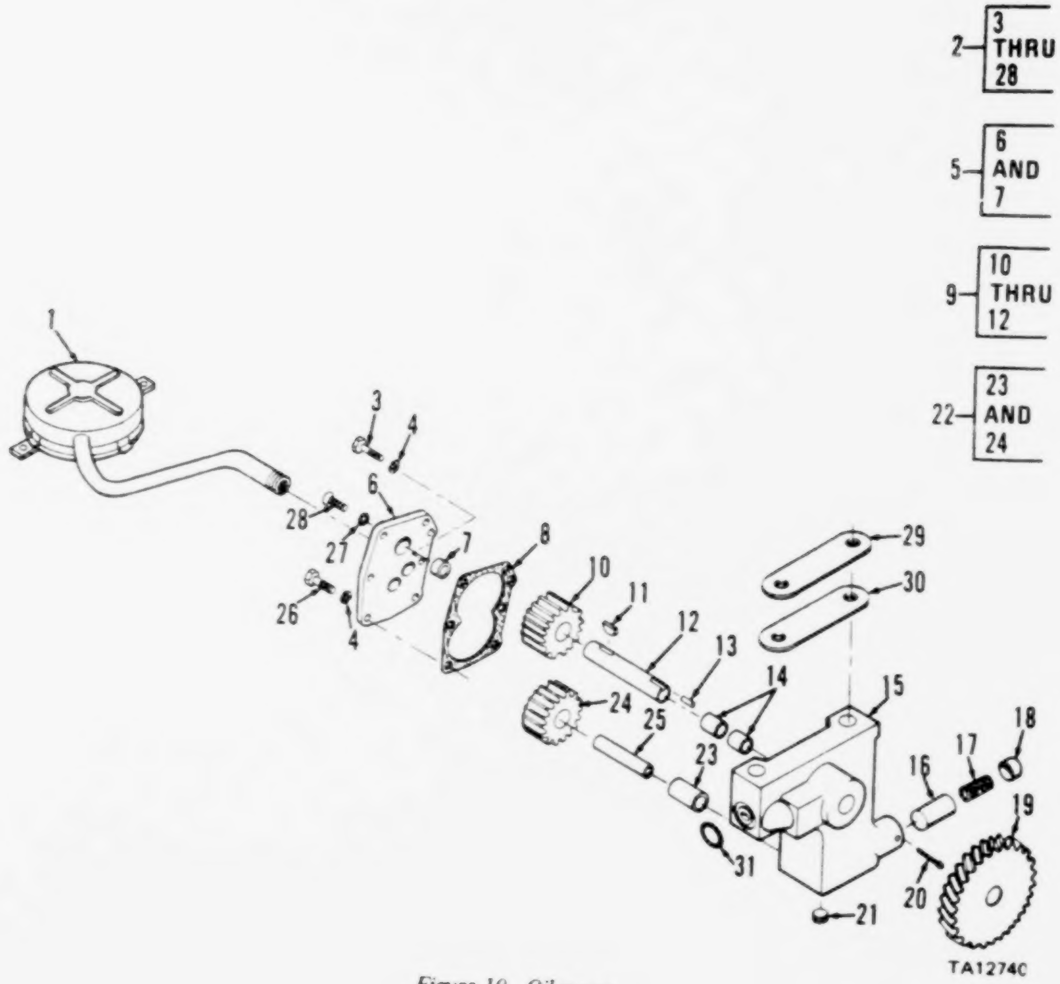
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Figure 10. Oil pump.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0106 ENGINE LUBRICATION SYSTEM	
				FIG. 10 OIL PUMP	
	PAHHO	10988	A38372	PUMP ASSY,OIL........................	1
1	PAHZZ	10988	A39896	.STRAINER ASSY,OIL...................	1
2	XAHZZ	10988	A152851	.PUMP ASSEMBLY, W/O SCREEN..........	1
3	PAHZZ	96906	MS90725-10	..SCREW,CAP,HEXAGON H...............	1
4	PAHZZ	96906	MS35338-44	..WASHER,LOCK........................	4
5	XAHZZ	10988	G11838	..COVER ASSEMBLY.....................	1
6	XAHZZ	10988	G2039	...COVER.............................	1
7	XAHZZ	10988	G49653	...BUSHING,SLEEVE....................	1
8	KBHZZ	10988	G46852	..GASKET PART OF KIT P/N A43198.....	1
9	XAHZZ	10988	G11896	..GEAR ASSY,OIL PUMP PUMP SHAFT....	1
10	XAHZZ	10988	G2115	...GEAR, OIL PUMP....................	1
11	PAHZZ	96906	MS35756-6	...KEY,WOODRUFF......................	1
12	XAHZZ	10988	G11335	...SHAFT,STRAIGHT PUMP..............	1
13	PAHZZ	80205	NAS561P4-6	..PIN,SPRING.........................	1
14	XAHZZ	10988	G49654	..BUSHING, BEARING...................	2
15	XAHZZ	10988	G2109	..BODY, OIL PUMP.....................	1
16	PAHZZ	10988	A29279	..VALVE,SAFETY RELIEF RELIEF........	1
17	XAHZZ	10988	G48500	..SPRING,HELICAL,COMP VALVE, 60 PSI	1
18	XAHZZ	10988	A29260	..RETAINER,OIL RELIEF VALVE SPRING.	1
19	XAHZZ	10988	G11336	..GEAR, DRIVE, OIL PUMP.............	1
20	PAHZZ	96906	MS24665-355	..PIN,COTTER.........................	1
21	XAHZZ	10988	A39321	..CAP,PROTECTIVE,DUST................	2
22	XAHZZ	10988	G37068	..GEAR ASSEMBLY, IDLER..............	1
23	XAHZZ	10988	G49672	...BUSHING,SLEEVE....................	1
24	XAHZZ	10988	G11748	...GEAR,SPUR.........................	1
25	XAHZZ	10988	G11334	..SHAFT, IDLER.......................	1
26	PAHZZ	96906	MS90725-6	..SCREW,CAP,HEXAGON H...............	3
27	PAHZZ	96906	MS35336-27	..WASHER,LOCK EXTERNAL TOOTH.......	2
28	PAHZZ	96906	MS35190-288	..SCREW,MACHINE......................	2
29	PAHZZ	10988	G11337	SHIM TO BEARING CAP.................	2
30	PAHZZ	10988	G11338	SHIM TO BEARING CAP.................	2
31	PAHZZ	10988	A27365	PACKING,PREFORMED BODY PORT........	1

END OF FIGURE

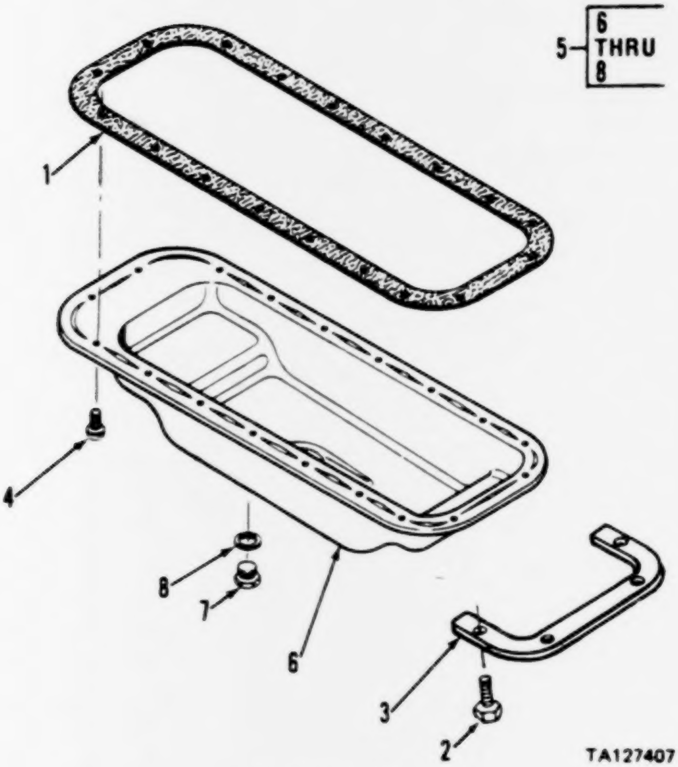
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Figure 11. Oil pan.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0106 ENGINE LUBRICATION SYSTEM	
				FIG. 11 OIL PAN	
1	KFFZZ	10988	A35273	GASKET, OIL PAN PART OF KIT P/N A44758	1
2	PAFZZ	78189	6718-61-07	SCREW,CAP,HEXAGON H	4
3	XBFZZ	10988	A151279	STRIP REINFORCEMENT, REAR, OIL PAN.	1
4	PAFZZ	78189	H62-311275-02	SCREW,CAP,HEXAGON H	14
5	PAFZZ	10988	A36717	OIL PAN WITH DRAIN PLUG	1
6	XAFZZ	10988	A36718	.OIL PAN WELDMENT ASSEMBLY	1
7	PAFZZ	10988	A140222	.PLUG,MACHINE THREAD	1
8	PAFZZ	10988	A58608	.GASKET PART OF KIT P/N A44758	1

END OF FIGURE

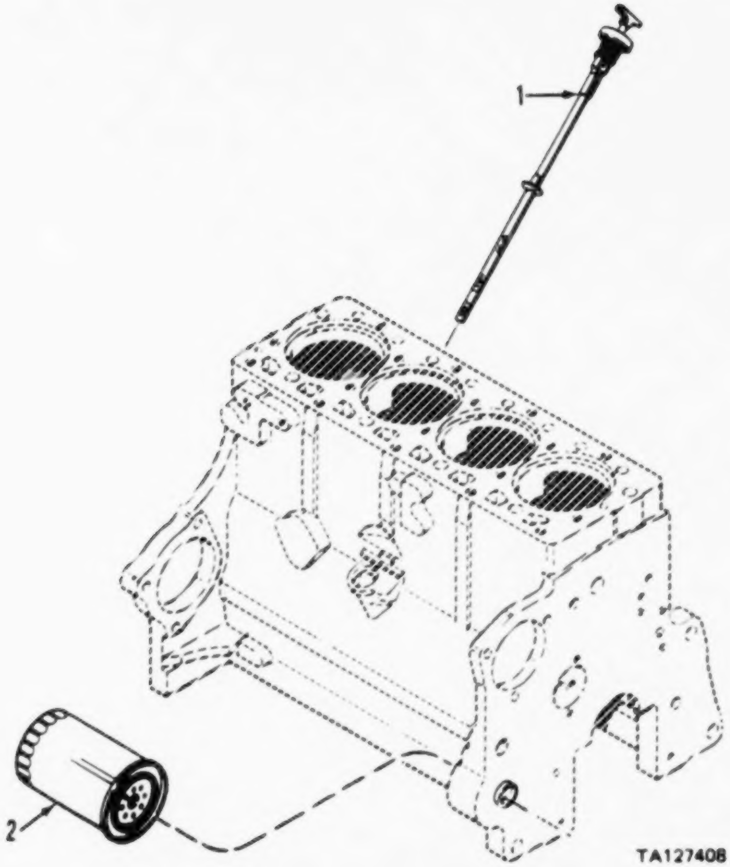
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Figure 12. Oil filter and dipstick.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0106 ENGINE LUBRICATION SYSTEM	
				FIG. 12 OIL FILTER AND DIPSTICK	
1	PAOZZ	10988	A150100	GAGE ROD-CAP,LIQUID..................	1
2	PAOZZ	79396	51452	FILTER ELEMENT,FLUI LUBRICATING....	1
				END OF FIGURE	

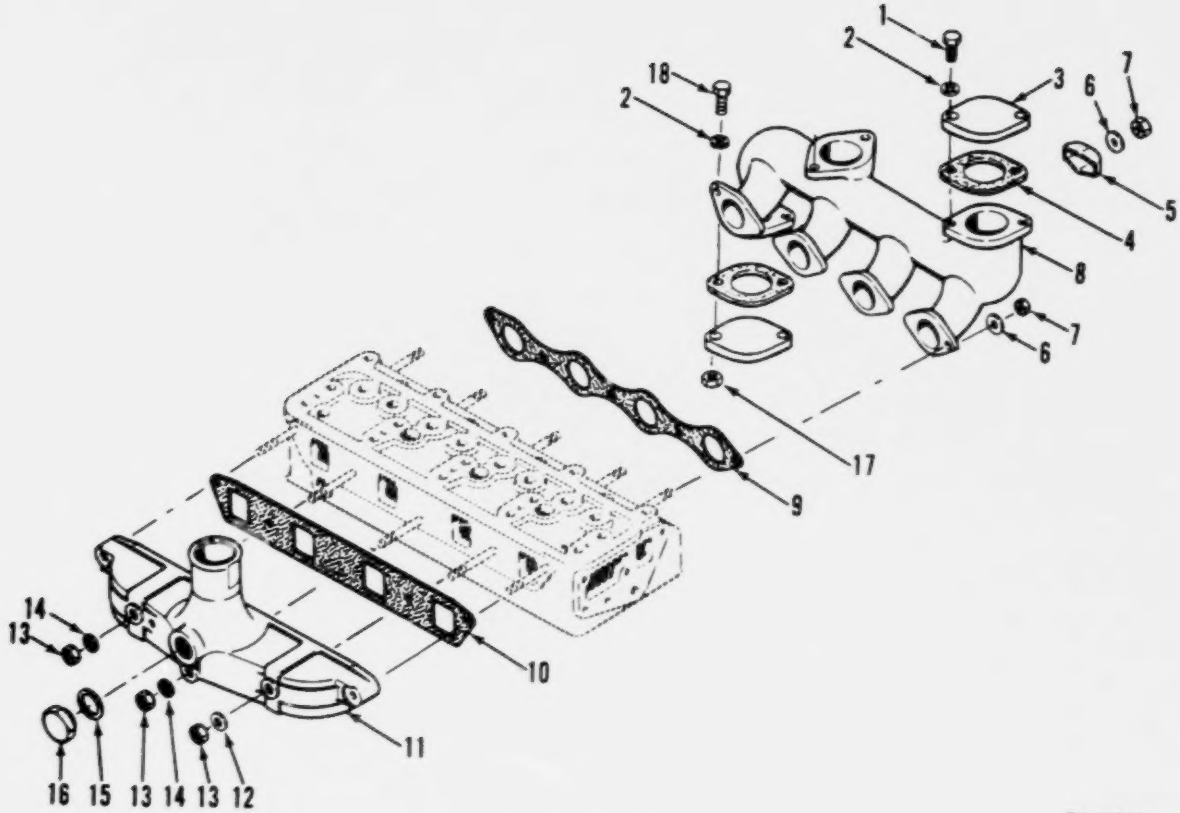
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Figure 13. Manifolds.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0108 MANIFOLDS	
				FIG. 13 MANIFOLDS	
1	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H..................	2
2	PAOZZ	96906	MS27183-14	WASHER,FLAT..........................	4
3	XBOZZ	10988	A38188	PLATE, OUTLET COVER EXHAUST MANIFOLD.............................	2
4	PAOZZ	10988	G46853	GASKET PLATE.........................	2
5	PAOZZ	10988	A35028	CLAMP,BRIDGE.........................	3
6	PAOZZ	96906	MS27183-14	WASHER,FLAT..........................	5
7	PAOZZ	96906	MS51922-17	NUT,SELF-LOCKING,HE..................	5
8	PAOZZ	10988	A39233	PARTS KIT,MANIFOLD...................	1
9	PAOZZ	10988	G46872	GASKET PART OF KIT P/N A155589.......	1
10	PAOZZ	10988	G46871	GASKET PART OF KIT P/N P/NA155589...	1
11	PAOZZ	10988	A152536	MANIFOLD,INTAKE......................	1
12	XDOZZ	96906	MS35338-50	.WASHER,LOCK.........................	2
13	PAOZZ	96906	MS51967-8	.NUT,PLAIN,HEXAGON...................	5
14	PAOZZ	83259	7500-3-8	.GASKET..............................	3
15	PAOZZ	10988	A20916	.SPACER,RING.........................	1
16	PAOZZ	10988	L10283	ADAPTER BUSHING MANIFOLD............	1
17	PAOZZ	96906	MS51922-17	NUT,SELF-LOCKING,HE..................	2
18	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	2

END OF FIGURE

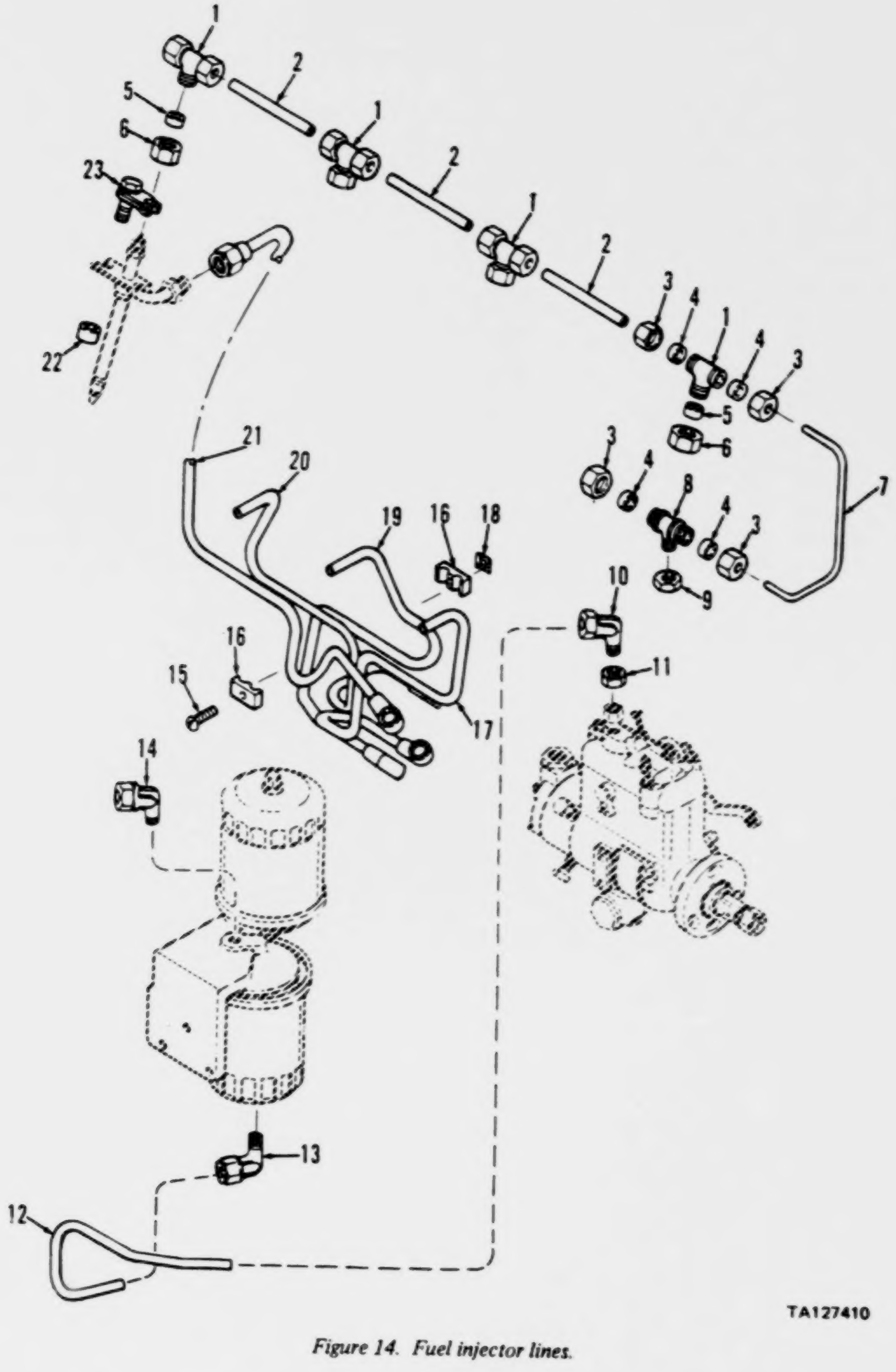
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Figure 14. Fuel injector lines.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 03 FUEL SYSTEM	
				GROUP 0301 CARBERETOR,FUEL INJECTOR	
				FIG. 14 FUEL INJECTOR LINES	
1	PAFZZ	84760	18334	TEE,TUBE	4
2	PAFZZ	10988	A38644	COUPLING,TUBE	3
3	PAFZZ	10988	222-112	NUT,TUBE COUPLING	8
4	PAFZZ	10988	222-102	BUSHING,RUBBER	8
5	PAFZZ	84760	17721	BUSHING,RUBBER CAP	4
6	PAFZZ	84760	17720	NUT	4
7	PAFZZ	10988	A142906	TUBE,BENT,STEEL	1
8	PAFZZ	10988	222-72	TEE,PIPE TO TUBE	1
9	PAFZZ	10988	A38160	LOCKNUT,PIPE	1
10	PAOZZ	10988	222-47	ELBOW,PIPE TO TUBE	1
11	XAOZZ	10988	A38161	LOCKNUT,PIPE INJ. PUMP ELBOW	1
12	PAOZZ	10988	A51784	TUBE,BENT,METALLIC TO INJ. PUMP	1
13	PAOZZ	10988	222-47	ELBOW,PIPE TO TUBE	1
14	PAOZZ	10988	217-294	ELBOW,PIPE TO HOSE INLET POINT	1
15	PAFZZ	10988	173-102	SCREW,MACHINE	2
16	PAOZZ	10988	A58709	BRACKET,INJECTOR TUBE	4
17	PAFZZ	10988	A37842	TUBE ASSEMBLY,METAL LINE	1
18	PAFZZ	96906	MS35649-202	NUT,PLAIN,HEXAGON	2
19	PAFZZ	10988	A37844	TUBE ASSEMBLY,METAL LINE	1
20	PAFZZ	10988	A37846	TUBE ASSEMBLY,METAL LINE	1
21	PAFZZ	10988	A37848	TUBE ASSEMBLY,METAL LINE	1
22	PAFZZ	84760	17195	SPACER,SLEEVE DOWN CLAMP	4
23	PAFZZ	84760	17199	CLAMP ASSEMBLY,NOZZ DOWN	4

END OF FIGURE

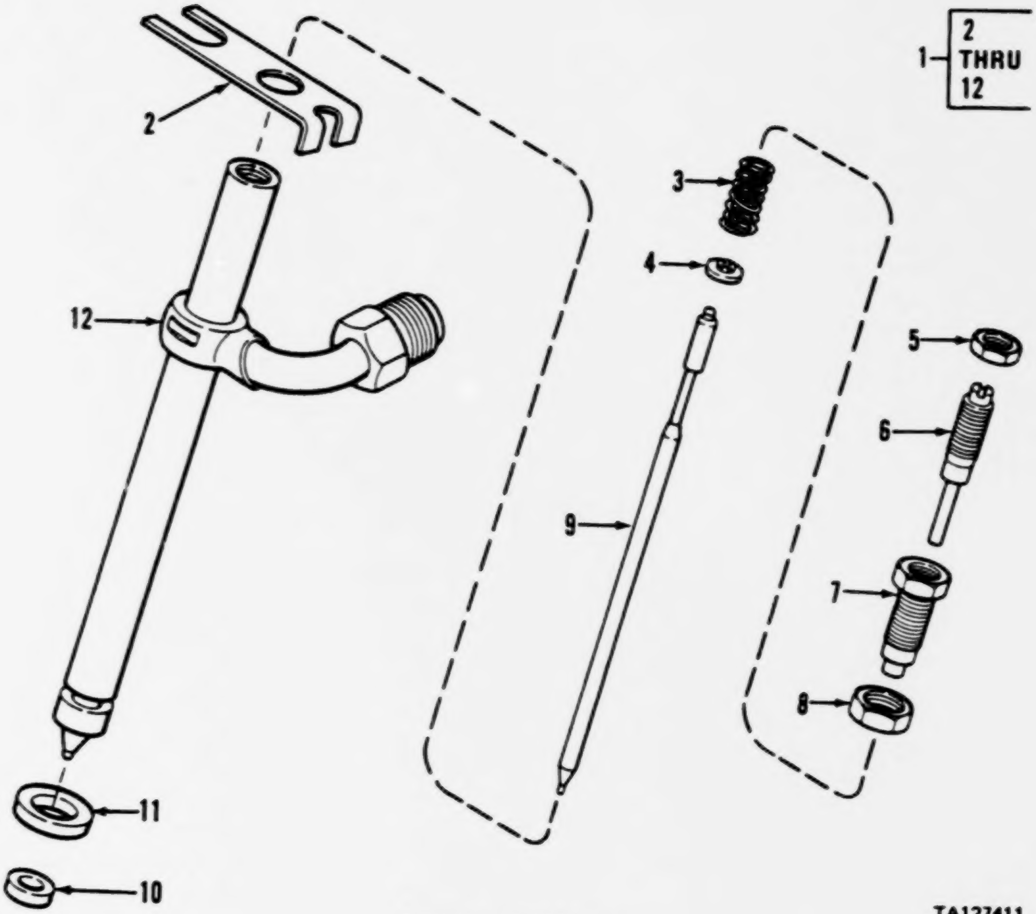
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Figure 15. Fuel injector.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0301 CARBERETOR,FUEL INJECTOR	
				FIG. 15 FUEL INJECTOR	
1	PAHZZ	84760	22365	NOZZLE,FUEL INJECTI INJECTOR.......	4
2	PAHZZ	84760	18053	.PLATE,NOZZLE LOCATI HOLDER........	1
3	PAHZZ	84760	18730	.SPRING,HELICAL,COMP ADJUSTING.....	1
4	PAHZZ	84760	16159	.SEAT,HELICAL COMPRE................	1
5	PAHZZ	84760	18544	.NUT,PLAIN,HEXAGON ADJUSTING SCREW.	1
6	PAHZZ	84760	18542	.SETSCREW...........................	1
7	PAHZZ	84760	18729	.ADJUSTER,PRESSURE ADJUSTING.......	1
8	PAHZZ	84760	17971	.NUT ADJUSTING SCREW...............	1
9	XAHZZ	84760	19818	.VALVE, NOZZLE BODY.................	1
10	PAFZZ	84760	16389	.SPACER,SLEEVE PART OF KIT P/N P/N A155589..........................	1
11	PAFZZ	84760	16168	.WASHER,FLAT PART OF KIT P/N A155589	1
12	XAHZZ	84760	NSS	.BODY, NOZZLE......................	1

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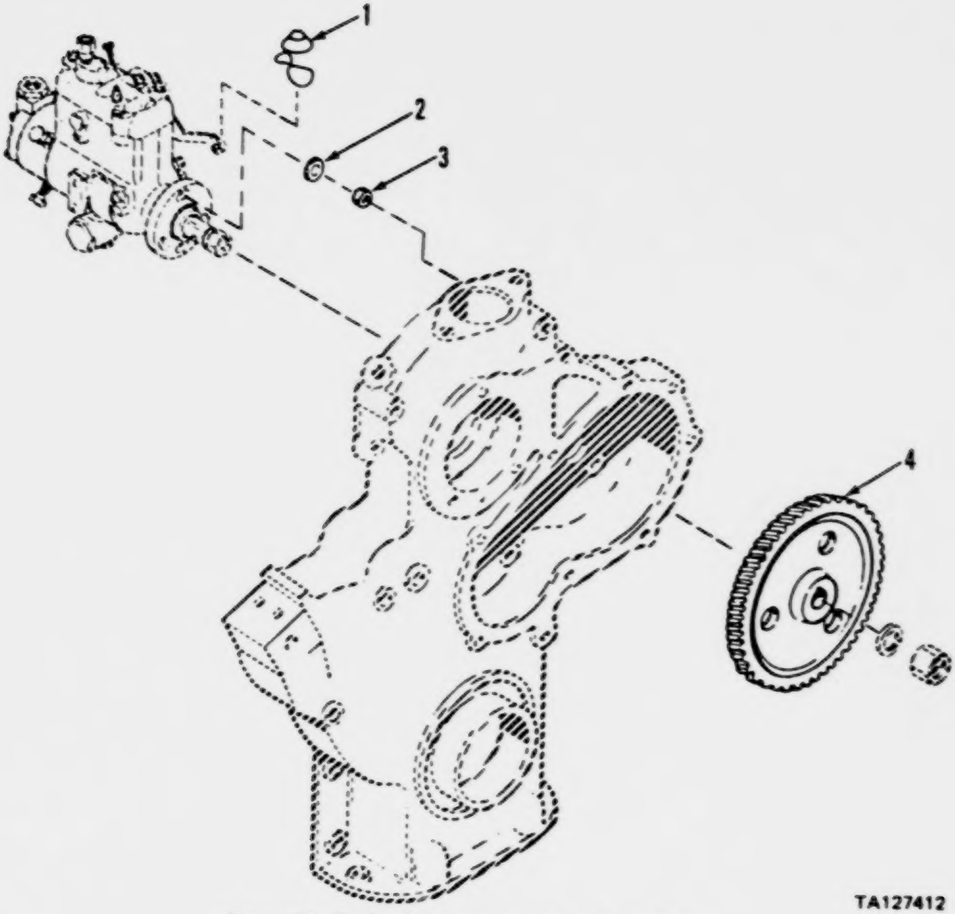

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Figure 16. Fuel injection pump mounting and gear.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0302 FUEL PUMPS	
				FIG. 16 FUEL INJECTION PJMP MOUNTING AND GEAR	
1	PAFZZ	84760	10408	SEAL,ANTIPILFERAGE PUMP WIRE.......	1
2	PAFZZ	10988	A30043	WASHER,FLAT.........................	3
3	PAFZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON..................	3
4	PAFZZ	10988	G2076	GEAR,HELICAL.......................	1

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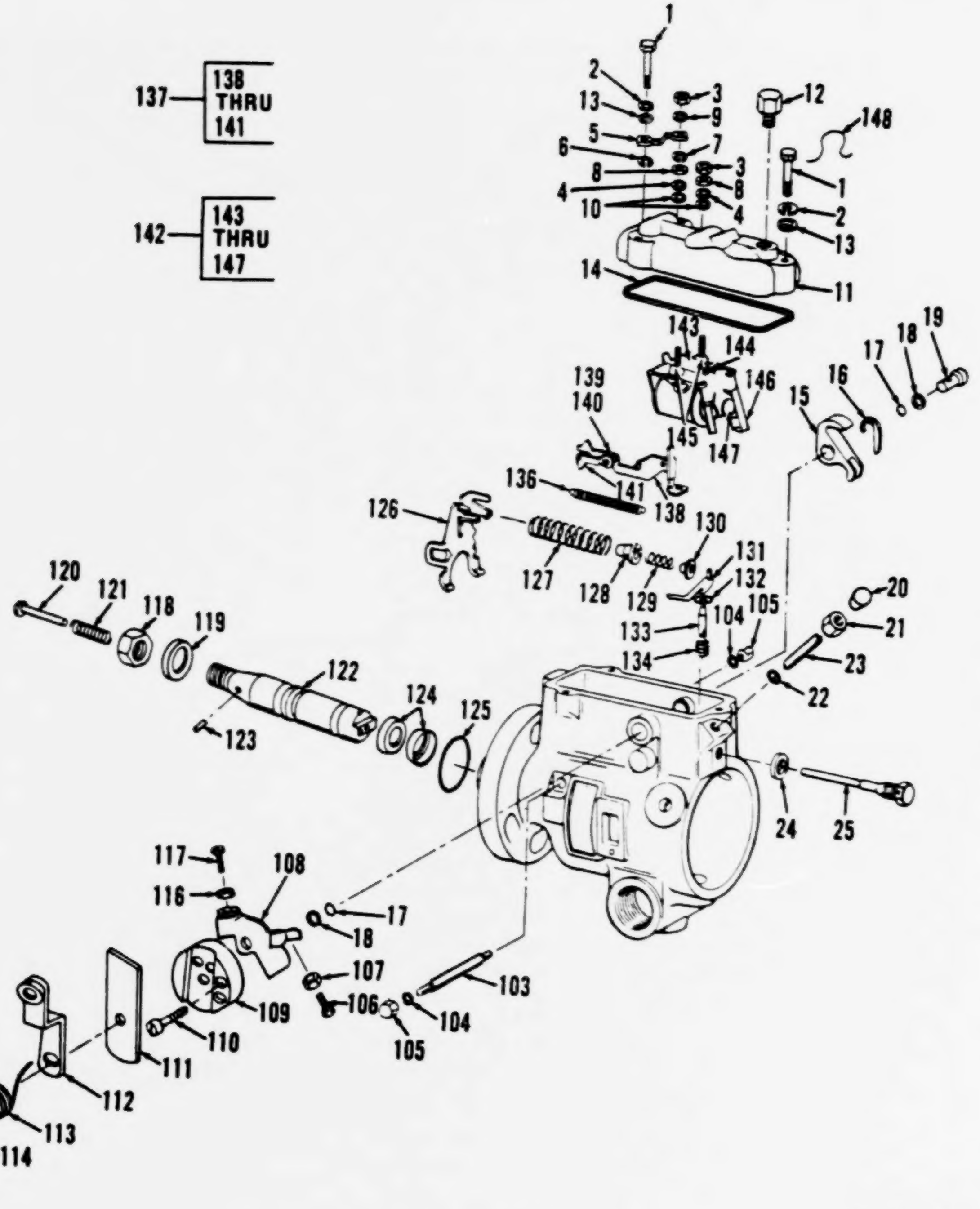
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Figure 17. Fuel injection pump (Sheet 1 of 2).

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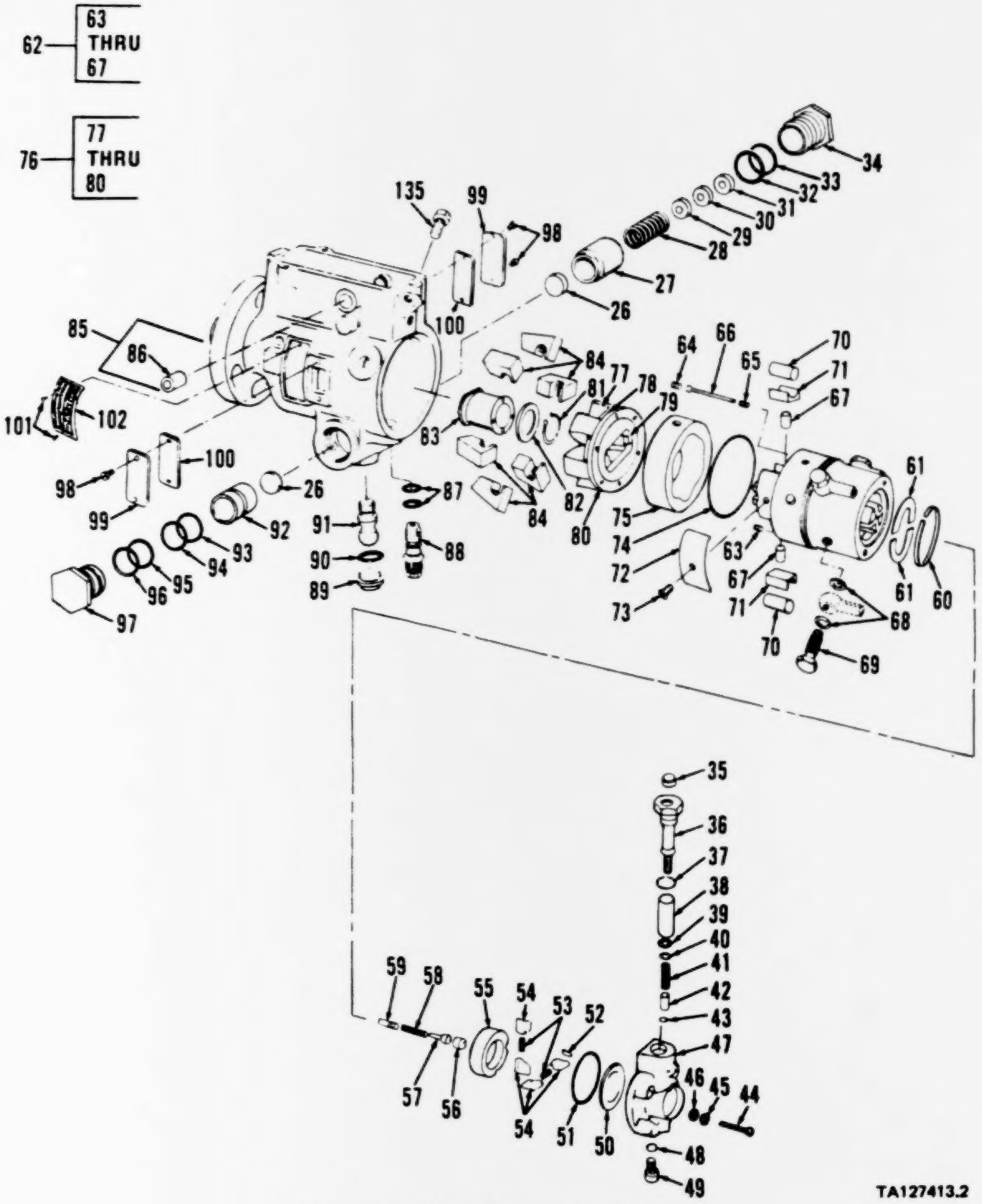
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Figure 17. Fuel injection pump (Sheet 2 of 2).

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0302 FUEL PUMPS	
				FIG. 17 FUEL INJECTION PUMP	
	PAFHH	84760	DB0431AL3813	PUMP,FUEL,METERING....................	1
1	PAHZZ	96906	MS35265-68	.SCREW,MACHINE DOWN.................	3
2	PAHZZ	84760	11582	.WASHER,LOCK SCREW.................	3
3	PAFZZ	18876	8527012	.NUT,SELF-LOCKING,HE PART OF KIT P/N 18525...............................	2
4	PAFZZ	84760	18501	.WASHER,FLAT PART OF KIT P/N 18525..	2
5	PAFZZ	84760	20951	.LEAD,ELECTRICAL GROUNDING..........	1
6	PAFZZ	78189	1210-00	.WASHER,LOCK........................	1
7	PAFZZ	96906	MS35333-38	.WASHER,LOCK TERMINAL CONTACT......	1
8	PAFZZ	96906	MS35649-282	.NUT,PLAIN,HEXAGON PART OF KIT P/N 18525................................	2
9	PAFZZ	84760	18501	.WASHER,FLAT CONTACT................ COVER,GOVERNOR	2
10	PAFZZ	84760	12500	.WASHER,SHOULDERED PART OF KIT P/N 18525...	2
11	KBHZZ	84760	12106	.COVER,GOVERNOR CONT PART OF KIT P/N 18525...............................	1
12	PAFZZ	29510	346729R91	.COUPLING,PIPE RETURN LINE.........	1
13	PAFZZ	19207	5325350	.WASHER,FLAT.........................	3
14	KBHZZ	84760	12054	.GASKET PART OF KIT P/N 16369 PART OF KIT P/N 18525..................	1
15	PAHZZ	84760	12221	.LEVER,THROTTLE SHAFT..............	1
16	PAHZZ	84760	12253	.CAM,SHUT OFF RETAINER.............	1
17	PAHZZ	84760	12040	.PACKING,PREFORMED PART OF KIT P/N 16369................................	2
18	PAHZZ	84760	14408	.WASHER PART OF KIT P/N 16369.......	1
19	PAHZZ	84760	16279	.PIN,STRAIGHT,HEADED.................	1
20	PAHZZ	84760	11611	.CAP,ADJUSTING SCREW................	1
21	PAHZZ	84760	13807	.NUT,PLAIN,HEXAGON..................	1
22	PAHZZ	84760	12040	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
23	XDHZZ	84760	14675	.SETSCREW............................	1
24	XDHZZ	84760	13556	.WASHER,FLAT PART OF KIT P/N 16369..	1
25	PAHZZ	84760	12208	.STUD,SPRING GUIDE..................	1
26	PAHZZ	84760	12622	.WASHER,CONCAVE......................	2
27	PAHZZ	84760	22124	.PISTON,FUEL INJECTO.................	1
28	XDHZZ	84760	12686	.SPRING,HELICAL,COMP ADVANCE........	1
29	PAHZZ	84760	12741	.SHIM SPRING.........................	2
30	XDHZZ	84760	12743	.SHIM SPRING.........................	1
31	PAHZZ	84760	12745	.SHIM,ADVANCE SPRING SPRING.........	1
32	PAHZZ	84760	12764	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
33	PAHZZ	84760	20113	.PACKING,PREFORMED PLUG............	1
34	XBHZZ	84760	12640	.PLUG,MACHINE THREAD................	1
35	PAHZZ	84760	15228	.PLUG ASSEMBLY,END PLATE ADJUSTING...........................	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(5) QTY
36	PAHZZ	84760	17058	.BOLT,FLUID PASSAGE..................	1
37	PAHZZ	84760	12406	.PACKING,PREFORMED PART OF KIT P/N 16369..............................	1
38	PAFZZ	84760	15225	.FILTER ELEMENT,FLUI................	1
39	PAHZZ	84760	15627	.WASHER,FLAT PART OF KIT P/N 16369..	1
40	PAHZZ	84760	11507	.PACKING,PREFORMED PART OF KIT P/N P/N 16369..........................	1
41	PAHZZ	84760	15701	.SPRING,HELICAL,COMP................	1
42	PAHZZ	84760	11508	.PISTON,REGULATING,E................	1
43	PAHZZ	84760	17056	.SEAL,PISTON PART OF KIT P/N 16369..	1
44	PAHZZ	84760	17506	.SCREW..............................	4
45	PAHZZ	84760	11582	.WASHER,LOCK PLATE SCREW............	4
46	PAHZZ	19207	5325350	.WASHER,FLAT SCREW..................	4
47	PAHZZ	84760	15877	.PLATE,END,FUEL PUMP................	1
48	PAHZZ	84760	12966	.PACKING,PREFORMED PART OF KIT P/N 16369..............................	1
49	PAHZZ	84760	17451	.PLUG,MACHINE THREAD................	1
50	PAHZZ	84760	15875	.THRUST PLATE,FUEL I................	1
51	PAHZZ	84760	11329	.PACKING,PREFORMED PART OF KIT P/N 16369..............................	1
52	PAHZZ	84760	11525	.SPACER,SLEEVE LOCATING............	1
53	PAHZZ	84760	15699	.SPRING,HELICAL,COMP PUMP BLADE....	2
54	PAHZZ	84760	18137	.BLADE,PUMP,TRANSFER PUMP..........	4
54	PAHZZ	84760	20511	.BLADE,TRANSFER PUMP PUMP, OVERSIZE	4
54	PAHZZ	84760	20512	.BLADE,TRANSFER PUMP PUMP, OVERSIZE	4
55	PAHZZ	84760	16753	.LINER,FUEL PUMP PUMP..............	1
56	PAHZZ	84760	13837	..SCREW,VALVE,RETAINI VALVE........	1
57	PAHZZ	84760	16440	..STOP,DELIVERY VALVE PART OF KIT P/N 16369..........................	1
58	PAHZZ	84760	13839	.SPRING,HELICAL,COMP VALVE.........	1
59	XDHZZ	84760	13819	.PISTON,DELIVERY VAL................	1
59	XAHZZ	84760	13820	..VALVE, DELIVERY OVERSIZE.........	1
60	PAHZZ	84760	11208	..RING RETAINING RETAINER..........	1
61	PAHZZ	84760	11212	.SPACER,PLATE.......................	2
62	PAHZZ	84760	20387	.HYDRAULIC HEAD AND ROTOR ASSEMBLY.	1
63	PAHZZ	84760	12216	..SETSCREW HEAD PLUG................	1
64	PAHZZ	84760	11438	..SETSCREW HEAD PLUG................	2
65	PAHZZ	84760	11437	..WIRE,VENT.........................	1
65	XBHZZ	84760	14565	..WIRE, VENT, OVERSIZE.............	1
66	PAHZZ	84760	11439	..WIRE,RETAINER RETAINER...........	1
67	PAHZZ	84760	11067	..PLUNGER,DETENT STANDARD..........	2
68	PAFZZ	10988	G49407	.SPACER,RING PART OF KIT P/N 16369 PART OF KIT P/N A155589..............	8
69	PAFZZ	84760	11346	.BOLT,FLUID PASSAGE FUEL LINE......	4
70	PAHZZ	84760	11141	.PIN,STRAIGHT,HEADLE................	2
71	XDHZZ	84760	20116	.SHOE SET,CAM ROLLER................	2
72	PAHZZ	84760	11196	.SPRING,FLAT........................	1
73	PAHZZ	84760	11175	.SCREW,SELF-LOCKING ADJUSTING......	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
74	PAHZZ	84760	11304	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
75	PAHZZ	84760	10373	.COLLAR,SHAFT.........................	1
76	PAHZZ	84760	19603	.RETAINER ASSEMBLY, GOVERNOR WEIGHT................................	1
77	XAHZZ	84760	19527	..RETAINER, GOVERNOR WEIGHT.........	1
78	PAHZZ	84760	17513	..RETAINER,PACKING PART OF KIT P/N 16369................................	1
79	PAHZZ	84760	18986	..HUB ASSEMBLY,GOVERN GOVERNOR WEIGHT................................	1
80	XAHZZ	84760	19603	..RETAINER ASSEMBLY, GOVERNOR WEIGHT................................	1
81	PAHZZ	96906	MS16624-1093	.RING,RETAINING GOVERNOR CAGE......	1
82	PAHZZ	84760	11620	.BEARING,WASHER,THRU THRUST SLEEVE.	1
83	PAHZZ	84760	14483	.BEARING,SLEEVE THRUST..............	1
84	PAHZZ	84760	11643	.WEIGHT,OVER-SPEED	6
85	XAHHH	84760	14846	.HOUSING ASSEMBLY...................	1
86	PAHZZ	84760	15093	..BUSHING,SLEEVE SHAFT..............	2
87	PAHZZ	84760	11507	.PACKING,PREFORMED PART OF KIT P/N 16369................................	2
88	PAHZZ	84760	22238	.CARTRIDGE,RELIEF VAL HEAD LOCATING.	1
89	XBHZZ	84760	12765	.PLUG HOLE.......................... PACKING,PREFORMED (2) 17-124	1
90	PAHZZ	84760	12766	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
91	PAHZZ	84760	12637	.SCREW CAM RING ADVA................	1
92	XBHZZ	84760	19590	.PISTON, POWER......................	1
93	PAHZZ	84760	15750	.GASKET PART OF KIT P/N 16369.......	1
94	PAHZZ	84760	18967	.RING,PISTON........................	1
95	PAHZZ	84760	12764	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
96	PAHZZ	84760	20113	.PACKING,PREFORMED PART OF KIT P/N 16369................................	1
97	PAHZZ	84760	18968	.PLUG HOLE..........................	1
98	PAHZZ	84760	10584	.SCREW,MACHINE......................	4
99	PAHZZ	84760	10567	.COVER,ACCESS.......................	2
100	PAHZZ	84760	10574	.GASKET PART OF KIT P/N 16369....... PACKING,PREFORMED (1) 17-22	2
101	PAHZZ	96906	MS21318-7	.SCREW,DRIVE PLATE..................	2
102	PAHZZ	84760	10394	.PLATE,IDENTIFICATIO IDENTIFICATION	1
103	PAHZZ	84760	12214	.SHAFT,GOVERNOR ARM PIVOT...........	1
104	PAHZZ	84760	11588	.PACKING,PREFORMED PART OF KIT P/N 16369................................	2
105	PAHZZ	84760	12288	.NUT,PLAIN,HEXAGON RETAINING.......	2
106	PAHZZ	84760	12169	.SCREW,MACHINE ADJUSTING............	1
107	PAHZZ	84760	12174	.NUT,PLAIN,HEXAGON ADJUSTING.......	1
108	PAHZZ	84760	12019	.SHAFT ASSY,THROTTLE THROTTLE......	1
109	XDHZZ	84760	16135	.SPACER LEVER ADJUSTING............. PACKING,PREFORMED (1) 17-74	1
110	PAHZZ	96906	MS16997-30	.SCREW,CAP,SOCKET HE LEVER POSITION	1
111	PAHZZ	84760	16136	.ARM,ADJUSTING SPACE SPACER........	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
112	XBHZZ	84760	12952	.LEVER ASSEMBLY THROTTLE............	1
113	PAHZZ	84760	13003	.SPRING,HELICAL,TORS LEVER..........	1
114	PAHZZ	84760	13010	.RETAINER,HELICAL CO LEVER SPRING..	1
115	PAHZZ	84760	15668	.SCREW,CAP,SOCKET HE LEVER SPRING..	1
116	PAHZZ	84760	12174	.NUT,PLAIN,HEXAGON.................	1
117	PAHZZ	84760	12972	.SCREW,MACHINE.....................	1
118	PAHZZ	84760	10529	.NUT,PLAIN,HEXAGON.................	1
119	PAHZZ	84760	10534	.WASHER,LOCK.......................	1
120	PAHZZ	84760	20269	.BUTTON,THRUST INJEC............... PACKING,PREFORMED (1) 17-51	1
121	PAHZZ	84760	10541	.SPRING,HELICAL,COMP BUTTON........	1
122	PAHZZ	10988	A44710	.SHAFT,SHOULDERED..................	1
123	PAHZZ	84760	19921	..PIN,SPRING SHAFT.................	1
124	PAHZZ	84760	10453	.PACKING,PREFORMED PART OF KIT P/N 16369............................	2
125	PAHZZ	84760	10519	.PACKING,PREFORMED PART OF KIT P/N 16369............................	1
126	PAHZZ	84760	14482	.ARM,GOVERNOR......................	1
127	PAHZZ	84760	17997	.SPRING,HELICAL,COMP CONTROL.......	1
128	PAHZZ	84760	12210	.SEAT,HELICAL COMPRE...............	1
129	PAHZZ	84760	11966	.SPRING,HELICAL,COMP............... PACKING,PREFORMED (1) 17-48	1
130	PAFZZ	84760	11969	.SEAT,HELICAL COMPRE SPRING........	1
131	PADZZ	84760	14680	.ARM ASSEMBLY, METERING VALVE	1
132	PAHZZ	84760	11610	.SHIM VALVE........................	1
133	PAHZZ	84760	20849	.VALVE,METERING SIZE A.............	1
133	PAOOO	84760	22250	.VALVE ASSEMBLY,METE SIZE B........	1
134	PAHZZ	84760	20359	.SPRING,HELICAL,COMP VALVE.........	1
135	PAHZZ	84760	11331	.BOLT,MACHINE HEAD LOCKING.........	2
136	PAHZZ	84760	11919	.SPRING,HELICAL,EXTE LINKAGE.......	1
137	PAHZZ	84760	11901	.HOOK ASSEMBLY GOVERNOR LINKAGE............................	1
138	PAHZZ	84760	11900	..HOOK,GOVERNOR LINKA LINKAGE......	1
139	PAHZZ	84760	12360	..SCREW,MACHINE.................... PACKING,PREFORMED (1) 17-37	1
140	PAHZZ	84760	12362	..WASHER,SPRING TENSI..............	1
141	PAHZZ	84760	12358	..LINK FUEL INJECTION..............	1
142	KBHZZ	84760	21677	.SOLENOID FRAME P/N 18525 PART OF KIT P/N 16369	1
142	KBHZZ	84760	21807	.SOLENOID,ELECTRICAL P/N 18525 AND 22149 PART OF KIT P/N 18525 PART OF KIT P/N 22149........................	1
143	PAHZZ	84760	16396	..BUSHING,RUBBER SPRING............	1
144	PAHZZ	84760	12480	..SPRING,HELICAL,EXTE COIL ARM.....	1
145	PAHZZ	84760	12513	..BUSHING,RUBBER INSULATING........	2
146	XAHZZ	84760	21322	..ARM ASSEMBLY SOLENOID USED ON P/N 21677..............................	1
146	XBHHZ	84760	21583	..ARM ASSEMBLY, SOLENOID USED ON P/N 21807..........................	1
147	XAHZZ	84760	21321	..PLUNGER, SOLENOID USED ON P/N 21677............................	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
147	XAHZZ	84760	21582	..PLUNGER, SOLENOID USED ON P/N 21807..................................	1
148	PAHZZ	84760	10408	.SEAL,ANTIPILFERAGE..................	4
149	PAHZZ	84760	16369	GASKET KIT........................... PACKING,PREFORMED (1) 17-4	1
150	PAHZZ	84760	18525	COVER AND SOLENOID GOVERNOR CONTROL COVER AND SOLENOID FRAME ASSEMBLY..	1
151	PAHZZ	84760	22149	REPAIR KIT COIL ARM ARM AND SOLENOID FRAME ASSEMBLY.............	1

END OF FIGURE

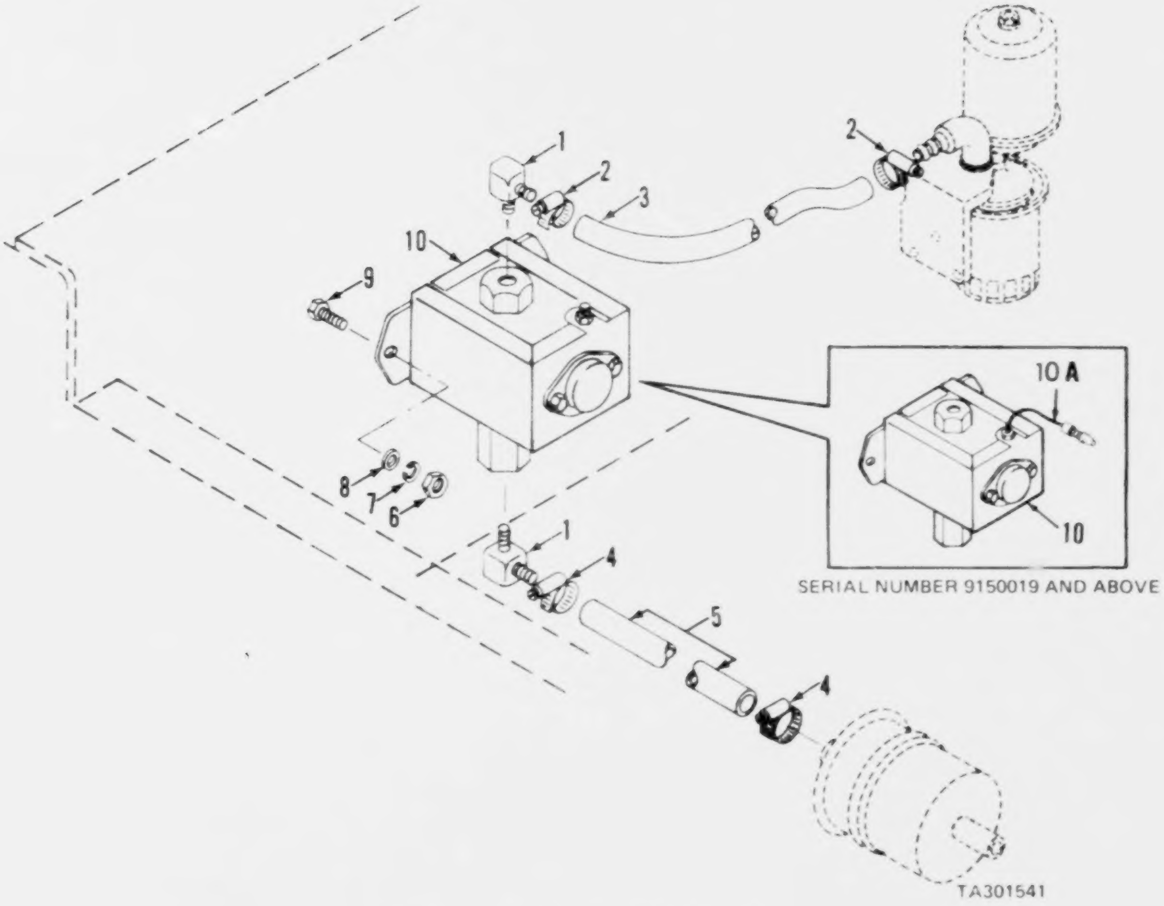
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Figure 18. Electric fuel pump and lines.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0302 FUEL PUMPS	
				FIG. 18 ELECTRIC FUEL PUMP AND LINES	
1	PAOZZ	99103	23916-4-2	ELBOW,HOSE HOSE......................	2
2	PAOZZ	10988	214-274	CLAMP,HOSE...........................	2
3	MOOZZ	10988	D64267	HOSE, FILTER SUPPLY MAKE FROM P/N SAE30R1-1-4ID........................	1
4	PAOZZ	10988	214-274	CLAMP,HOSE...........................	2
5	PAOZZ	10988	L104714	HOSE,NONMETALLIC PART OF KIT P/N L36257.......	2
6	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON....................	1
7	PAOZZ	96906	MS35338-44	WASHER,LOCK..........................	2
8	PAOZZ	96906	MS27183-11	WASHER,FLAT..........................	2
9	PAOZZ	96906	MS90725-8	SCREW,CAP,HEXAGON H..................	2
10	PAOZZ	72850	480572	PUMP,FUEL,ELECTRICA..................	1
10A	PAOZZ	10988	L10051	TERMINAL,QUICK DISC..................	1

END OF FIGURE

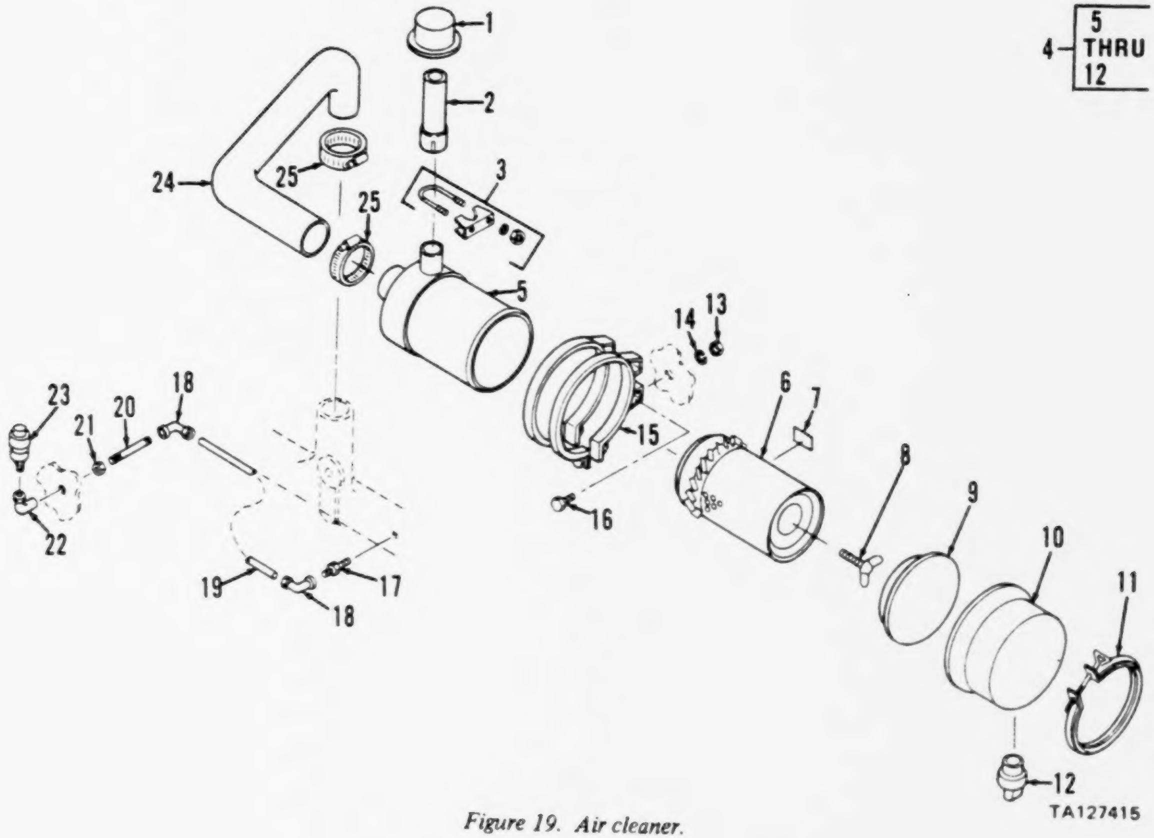
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Figure 19. Air cleaner.

GROUP 0304 AIR CLEANER

FIG. 19 AIR CLEANER

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	18265	GAX00-1966	CAP,AIR CLEANER INT..................	1
2	PAOZZ	10988	L104265	TUBE,METALLIC.........................	1
3	PAOZZ	10988	A13240	CLAMP,LOOP............................	1
4	PAOZZ	18265	FWG06-5131	AIR CLEANER,INTAKE...................	1
5	XAOZZ	10988	NSS	.BODY, AIR CLEANER...................	1
6	PAOZZ	18265	P10-5289	.FILTER ELEMENT,INTA.................	1
7	XAOZZ	18265	P13-8600	.PLATE, IDENTIFICATION.............	1
8	PAOZZ	18265	P10-2144	.NUT,PLAIN,WING......................	1
9	XAOZZ	18265	P10-2510	.BAFFLE..............................	1
10	PAOZZ	18265	P10-3836	.CUP, DUST,ASSY.....................	1
11	PAOZZ	18265	P00-2940	.CLAMP,LOOP..........................	1
12	PAOZZ	18265	P10-3198	.VALVE,VACUATOR......................	1
13	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	4
14	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	4
15	PAOZZ	10988	L11247	CLAMP,LOOP MTG.......................	2
16	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	4
17	XDOZZ	18265	P10-0089	ADAPTER,INDICATOR....................	1
18	PAOZZ	30327	770FB1/8IN	ELBOW,PIPE TO TUBE...................	2
19	XBOZZ	09505	22NSR	TUBE, NYLON..........................	1
20	PAOZZ	10988	221-102	NIPPLE,PIPE..........................	1
21	PAOZZ	09505	111-B 1/8-27NPT	NUT,SELF-LOCKING,HE..................	1
22	PAOZZ	10988	221-374	ELBOW,PIPE...........................	1
23	PAOZZ	18265	RAX00-2352	INDICATOR,FILTER	1
24	PAOZZ	10988	L101874	HOSE,PREFORMED.......................	1
25	PAOZZ	96906	MS35842-13	CLAMP,HOSE...........................	2

END OF FIGURE

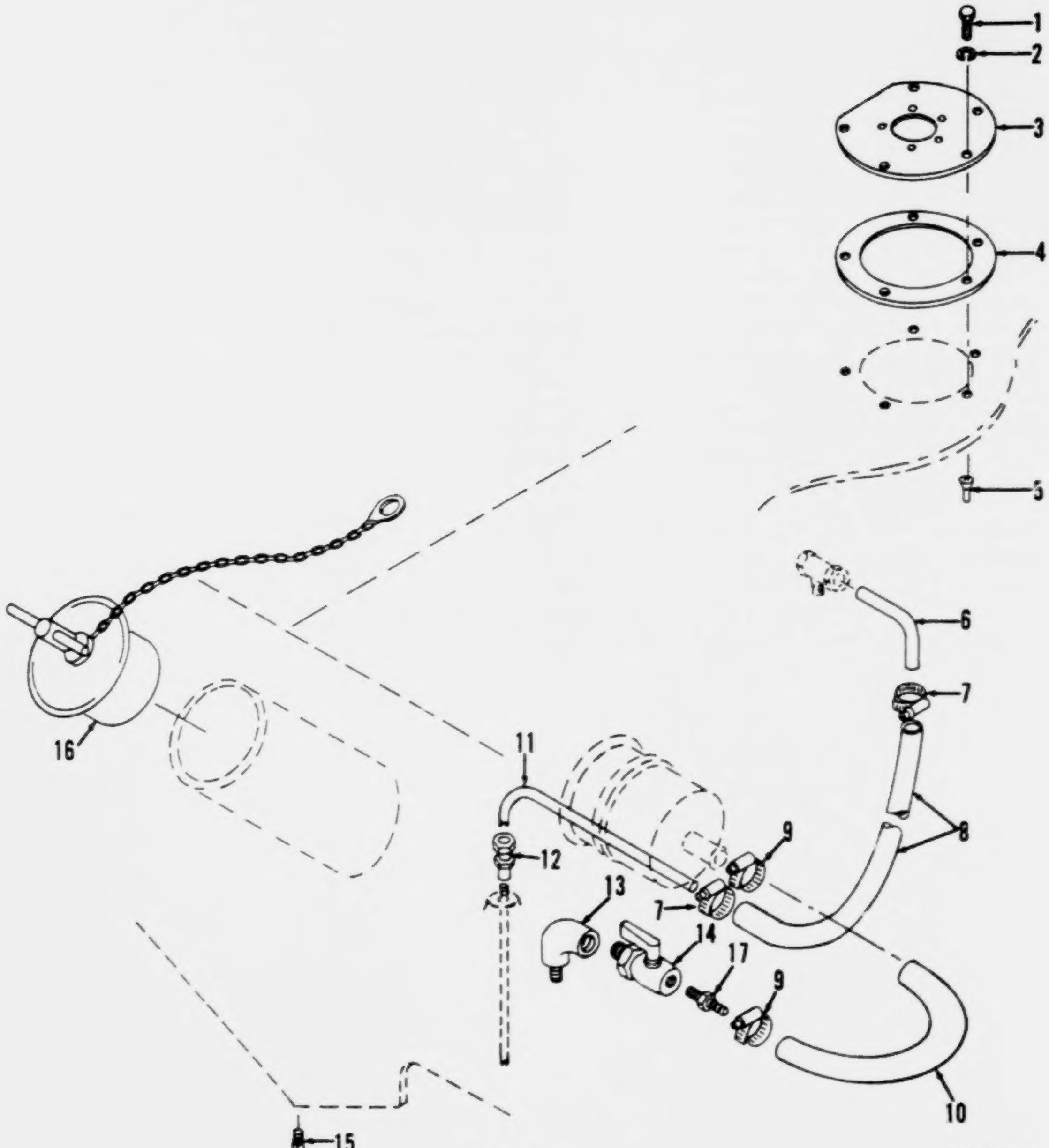
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Figure 20. Fuel tank and lines.

GROUP 0306 TANKS,LINES,FITTINGS,AND HEADERS

FIG. 20 FUEL TANK AND LINES

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	96906	MS90725-8	SCREW,CAP,HEXAGON H..................	5
2	PAOZZ	96906	MS35338-44	WASHER,LOCK..........................	5
3	XBOZZ	10988	L101729	PLATE, FUEL TANK HAND HOLE..........	1
4	PAOZZ	10988	L102555	GASKET..............................	1
5	PAOZZ	03481	S25B391	NUT,PLAIN,BLIND RIV..................	5
6	XBOZZ	10988	L74248	TUBE, RETURN.........................	1
7	PAOZZ	10988	214-274	CLAMP,HOSE...........................	2
8	MOOZZ	10988	D64267	HOSE, RETURN MAKE FROM P/N SAE30R1-1-4ID...........................	1
9	PAOZZ	10988	214-274	CLAMP,HOSE...........................	2
10	MOOZZ	10988	L102543	HOSE, FUEL MAKE FROM P/N SAE30R3-1-4ID..............................	1
11	PAOZZ	10988	L102542	TUBE,BENT,STEEL......................	1
12	PAOZZ	10988	222-639	ADAPTER,STRAIGHT,PI COMPRESSION....	1
13	PAOZZ	10988	217-1015	ELBOW,PIPE TO HOSE..................	1
14	PAOZZ	10988	L53739	COCK,PLUG............................	1
15	PAOZZ	96906	MS20913-6S	PLUG,PIPE............................	1
16	PAOZZ	08244	41740	CAP,FILLER OPENING...................	1
17	PAOZZ	10988	217-119	ADAPTER,STRAIGHT,PI..................	1

END OF FIGURE

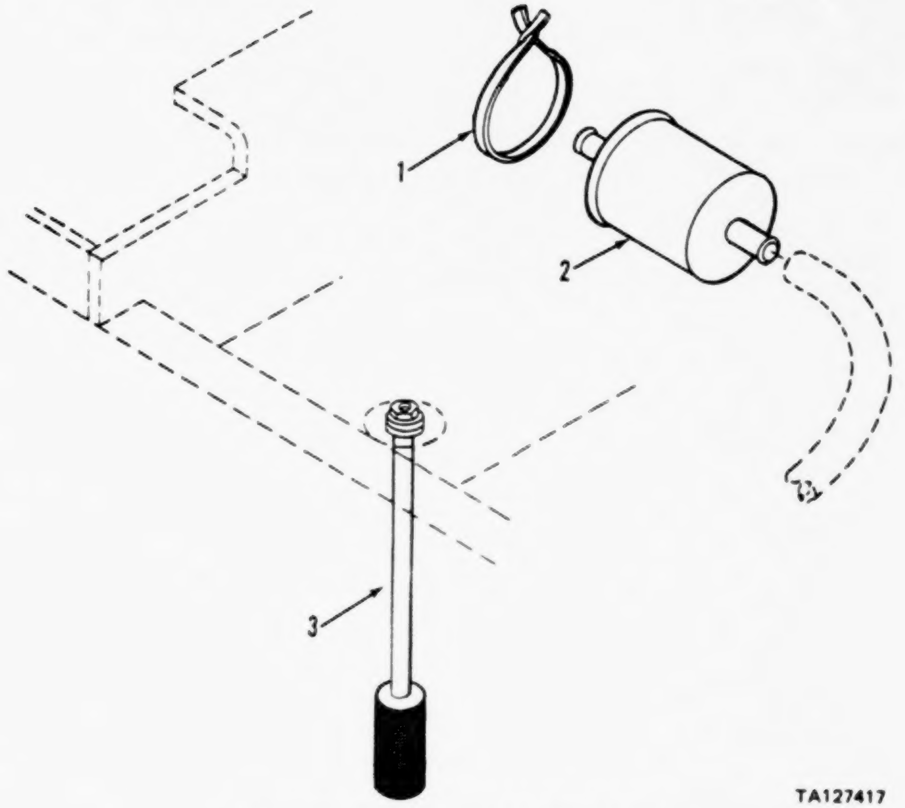
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Figure 21. Fuel strainer and in-line fuel filter.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0309 FUEL FILTERS	
				FIG. 21 FUEL STRAINER AND IN-LINE FUEL FILTER	
1	PAOZZ	10988	L18331	STRAP,TIEDOWN,ELECT..................	1
2	PAOZZ	70040	P/N5651834	FILTER,FLUID PART OF KIT P/N L36257.............................	1
3	PAOZZ	10988	L101361	STAINER ASSY,TANK F.................	1

END OF FIGURE

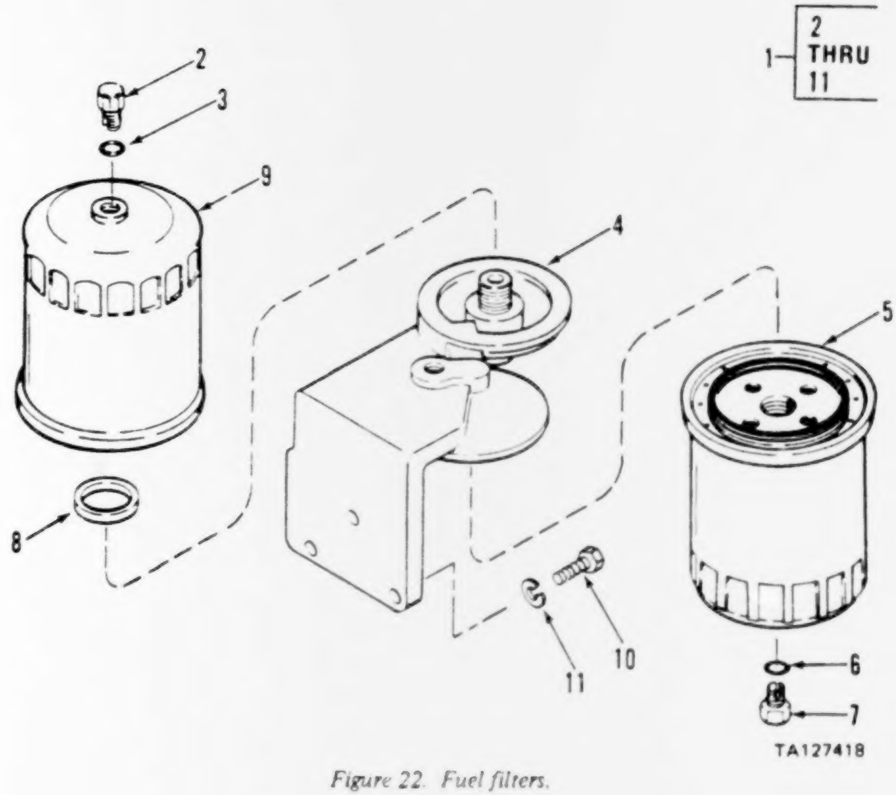
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Figure 22. Fuel filters.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0309 FUEL FILTERS	
				FIG. 22 FUEL FILTERS	
1	AOOOO	10988	A154934	FILTER ASSEMBLY FUEL................	1
2	PAOZZ	10988	218-5152	.PLUG,MACHINE THREAD FILTER VENT...	1
3	PAOZZ	10988	218-5002	..PACKING,PREFORMED.................	1
4	PFOZZ	10988	A154909	.HEAD, FUEL FILTER..................	1
5	PAOZZ	81321	6711419	FILTER ELEMENT,FLUI PART OF KIT P/N 818-A151281...........................	1
6	PAOZZ	10988	218-5002	.PACKING,PREFORMED DRAIN...........	1
7	PAOZZ	10988	G49080	.PLUG,FILTER DRAIN,.................	1
8	PAOZZ	10988	A42315	.GASKET.............................	1
9	PAOZZ	81321	6711418	FILTER,ELEMENT,FLUI PART OF KIT P/N 818-A151281...........................	1
10	PAOZZ	96906	MS90725-33	BOLT,MACHINE........................	3
11	PAOZZ	96906	MS35338-45	WASHER,LOCK.........................	3

END OF FIGURE

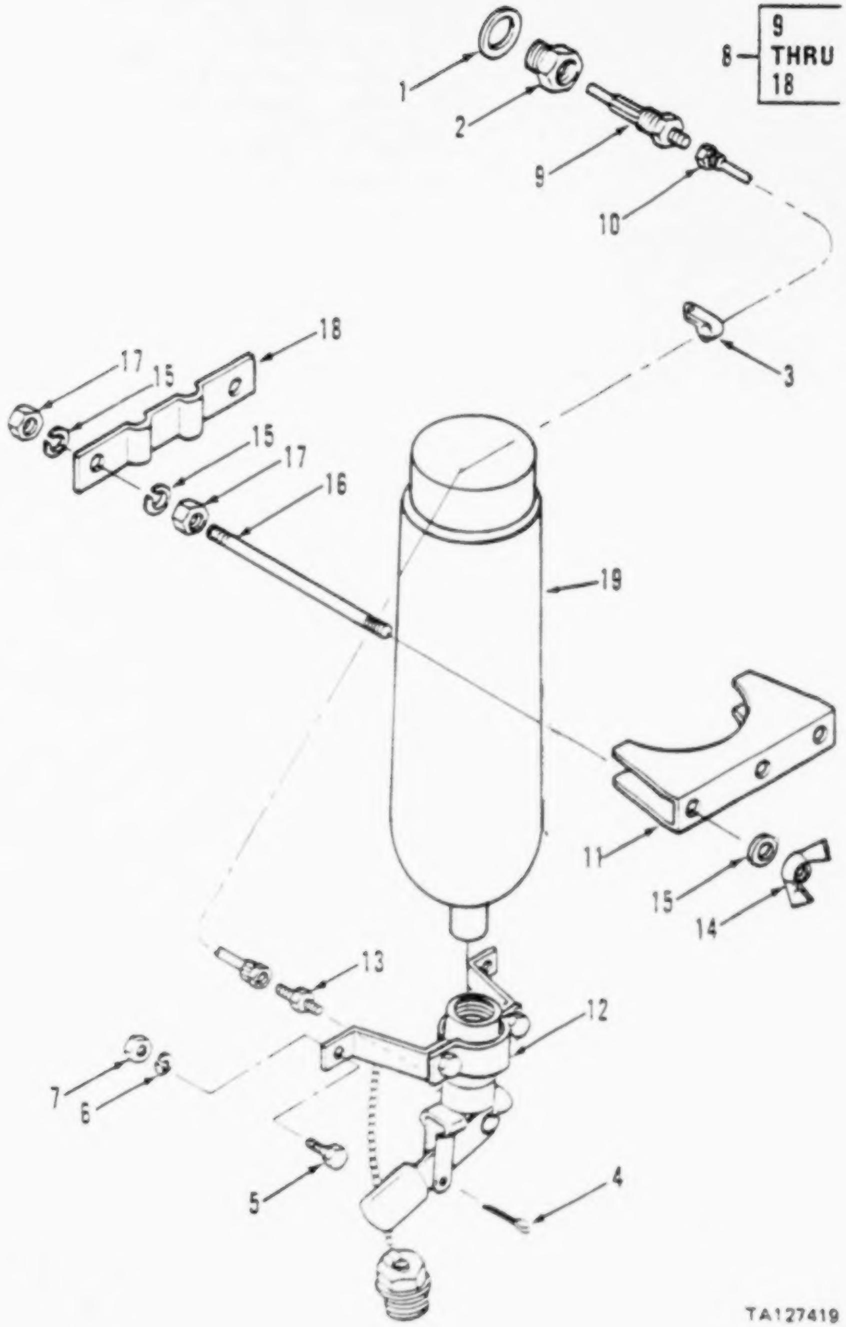
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Figure 23. Quick Start Kit

GROUP 0311 ENGINE STARTING AIDS

FIG. 23 QUICK START KIT

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	10988	A20916	SPACER,RING COPPER.................	1
2	PAOZZ	10988	L10283	ADAPTER BUSHING MANIFOLD...........	1
3	PAOZZ	75272	COV0413	CLAMP,LOOP..........................	2
4	PAOZZ	73342	6842326-115	PIN,LOCK............................	1
5	PAOZZ	96906	MS90725-32	BOLT,MACHINE........................	2
6	PAOZZ	96906	MS35338-45	WASHER,LOCK.........................	2
7	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON...................	2
8	PAOZZ	61112	QK-1027-B51	STARTING AID,ENG....................	1
9	KFOZZ	61112	QA1-2TC	.NOZZLE, SPRAY......................	1
10	KFOZZ	61112	LP3239-60	.TUBE, DELIVERY.....................	1
11	PAOZZ	61112	LP2299-1	.CLAMP ASSEMBLY.....................	1
12	KFOZZ	61112	QS1-2TC	.VALVE..............................	1
13	PAOZZ	61112	LP-4821-1	.FITTING,PIPE.......................	1
14	KFOZZ	61112	LP2290	.NUT,PLAIN,WING.....................	2
15	KFOZZ	96906	MS35338-45	.WASHER,LOCK........................	6
16	KFOZZ	61112	LP2287	.STUD,PLAIN.........................	2
17	KFOZZ	96906	MS51967-5	.NUT,PLAIN,HEXAGON..................	4
18	KFOZZ	61112	LP3904	.CLAMP..............................	1
19	PAOZZ	61112	LP535-1	CARTRIDGE,ENGINE ST.................	1

END OF FIGURE

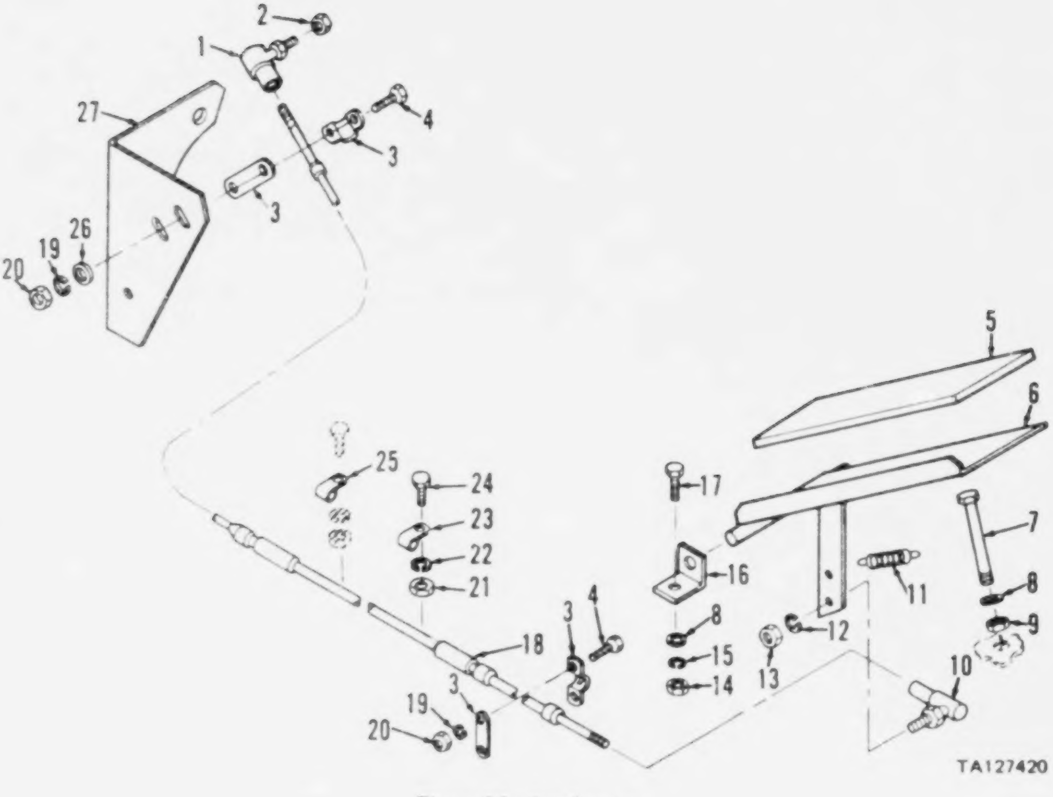
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Figure 24. Accelerator.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0312 ACCELERATOR,THROTTLE,OR CHOKE CABLES	
				FIG. 24 ACCELERATOR	
1	PAOZZ	41625	A31126	BALL JOINT	1
2	PAOZZ	96906	MS35650-302	NUT,PLAIN,HEXAGON	1
3	PAOZZ	41625	A31804	STRAP,RETAINING CABLE	2
4	PAOZZ	19207	591304	SCREW,CAP,HEXAGON	4
5	PAOZZ	10988	L71193	PAD, ACCELERATOR	1
6	XBOZZ	10988	L70914	PEDAL, ACCELERATOR	1
7	PAOZZ	96906	MS90725-70	SCREW,CAP,HEXAGON	1
8	PAOZZ	96906	MS27183-15	WASHER,FLAT	3
9	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	1
10	PAOZZ	01428	SPG1000CP	BALL JOINT	1
11	PAOZZ	10988	L79116	SPRING,HELICAL,COMP RETURN	1
12	PAOZZ	96906	MS35338-43	WASHER,LOCK	1
13	PAOZZ	96906	MS35650-302	NUT,PLAIN,HEXAGON	2
14	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
15	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
16	XBOZZ	10988	L73462	BASE, ACCELERATOR PIVOT	2
17	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON	2
18	PAOZZ	10988	L111987	SHAFT ASSY,FLEX	1
19	PAOZZ	96906	MS35338-43	WASHER,LOCK	4
20	PAOZZ	96906	MS35649-202	NUT,PLAIN,HEXAGON	4
21	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	1
22	PAOZZ	96906	MS35338-46	WASHER,LOCK	1
23	PAOZZ	10988	49859	CLAMP,LOOP	2
24	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON	1
25	PAOZZ	10988	49885	CLAMP,LOOP	1
26	PAOZZ	96906	MS27183-9	WASHER,FLAT	2
27	XBOZZ	10988	L77755	BRACKET ACCELERATOR CABLE	1

END OF FIGURE

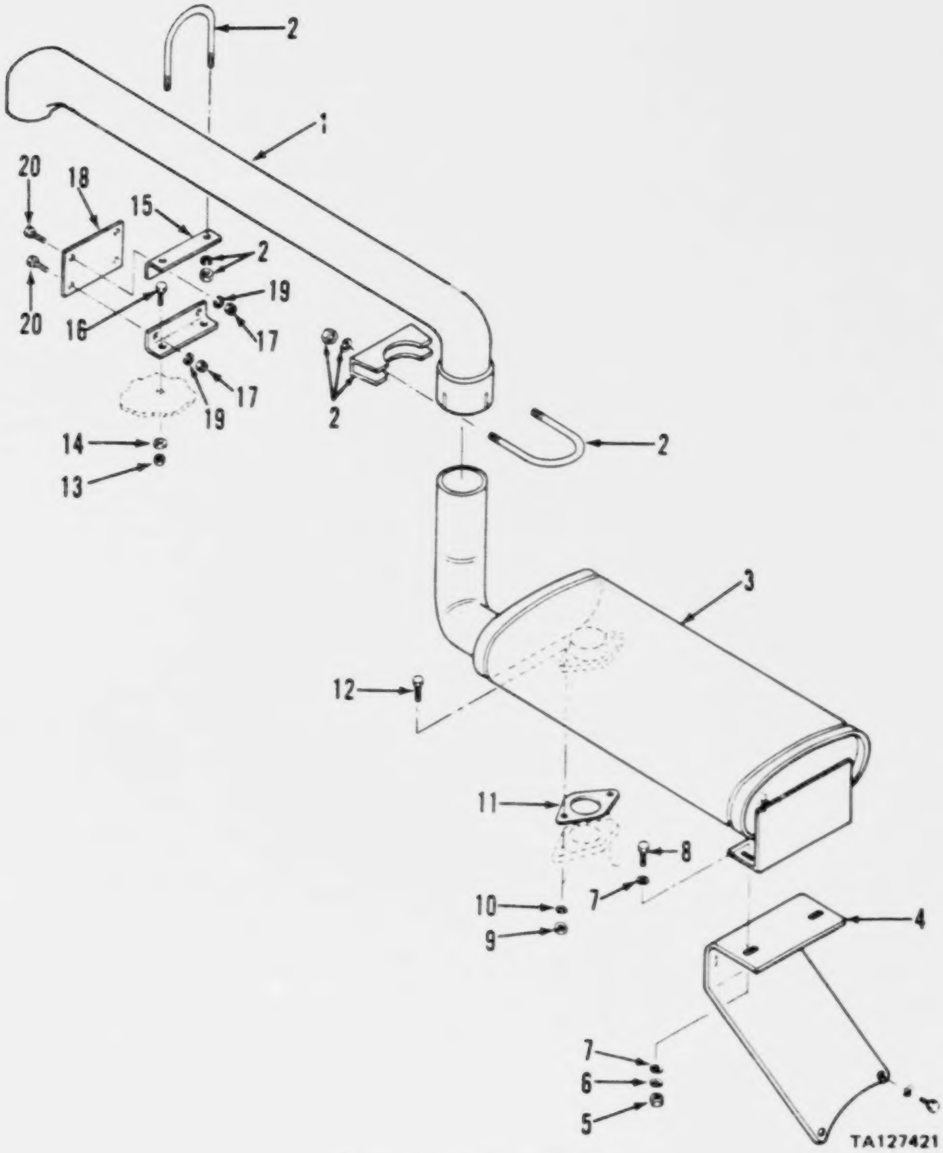
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Figure 25. Muffler and pipe.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 04 EXHAUST SYSTEM	
				GROUP 0401 MUFFLER AND PIPES	
				FIG. 25 MUFFLER AND PIPE	
1	PAOZZ	10988	L-101881	PIPE,EXHAUST	1
2	PAOZZ	10988	A13240	CLAMP,LOOP	2
3	PAOZZ	76700	17123NREVA	MUFFLER,EXHAUST ARRESTING	1
4	XBOZZ	10988	L102816	BRACKET, MUFFLER	1
5	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
6	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
7	PAOZZ	96906	MS27183-15	WASHER,FLAT	4
8	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON	2
9	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
10	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
11	PAOZZ	10988	G46853	GASKET MANIFOLD OUTLET	1
12	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON	2
13	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	2
14	PAOZZ	96906	MS35338-45	WASHER,LOCK	2
15	PAOZZ	10988	L104841	BRACKET,ANGLE	2
16	PAOZZ	96906	MS90725-34	BOLT,MACHINE	2
17	PAOZZ	96906	MS51922-9	NUT,SELF-LOCKING,H	4
18	XBOZZ	10988	L104840	SUPPORT, EXHAUST, RUBBER	1
19	PAOZZ	96906	MS27183-13	WASHER,FLAT	4
20	PAOZZ	96906	MS90725-34	BOLT,MACHINE	4

END OF FIGURE

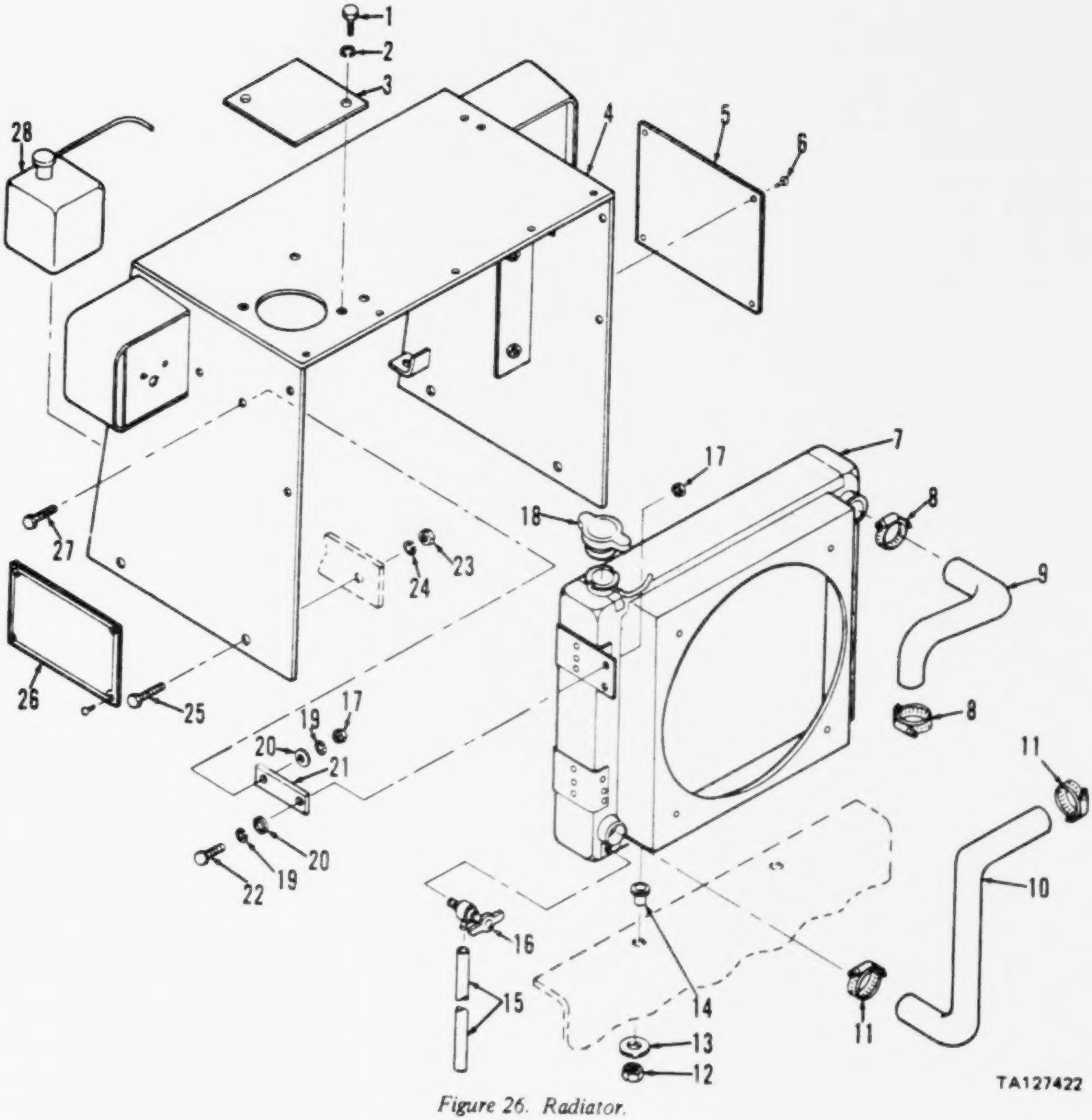
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Figure 26. Radiator.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 05 COOLING SYSTEM	
				GROUP 0501 RADIATOR,EVAPORATIVE COOLER,OR HEAT EXCHANGER	
				FIG. 26 RADIATOR	
1	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON	2
2	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	2
3	PAOZZ	10988	L103039	COVER,ACCESS.........................	1
4	XBFZZ	10988	L102967	SHROUD, RADIATOR WELDED............	1
5	XBOZZ	10988	L103299	PLATE, INFORMATION, SHIPPING DATA..	1
6	XBOZZ	10988	151-532	RIVET, POP...........................	8
7	PAFFF	02210	L103034	RADIATOR,ENGINE COO.................	1
8	PAFZZ	96906	MS35842-13	CLAMP,HOSE...........................	2
9	PAFZZ	10988	L-74743	HOSE,NONMETALLIC UPPER.............	1
10	PAFZZ	10988	L101052	HOSE,NONMETALLIC LOWER.............	1
11	PAFZZ	96906	MS35842-13	CLAMP,HOSE...........................	2
12	PAFZZ	96906	MS51922-17	NUT,SELF-LOCKING,HE.................	2
13	XBFZZ	10988	D52275	WASHER, SNUB.........................	2
14	PAFZZ	76005	J7153-1	BUSHING,RUBBER.......................	2
15	PAFZZ	10988	L13809	HOSE,NONMETALLIC DRAIN.............	1
16	PAFZZ	30327	303E	COCK,DRAIN DRAIN....................	1
17	PAFZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	2
18	PAOZZ	78225	AAX-0665-03	CAP,FILLER OPENING...................	1
19	PAFZZ	96906	MS35338-46	WASHER,LOCK..........................	4
20	PAFZZ	96906	MS27183-15	WASHER,FLAT..........................	4
21	XBFZZ	10988	L50641	STRAP, RADIATOR MOUNTING...........	2
22	PAFZZ	96906	MS90725-62	SCREW,CAP,HEXAGON	2
23	PAFZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON....................	4
24	PAFZZ	96906	MS35338-48	WASHER,LOCK..........................	4
25	PAFZZ	96906	MS90728-114	SCREW,CAP,HEXAGON	4
26	XBOZZ	10988	L103946	PLATE, MAINTENANCE...................	1
27	PAFZZ	96906	MS90725-64	SCREW,CAP,HEXAGON	2
28	PAFZZ	10988	L102958	TANK,RADIATOR EXPAN COOLANT........	1

END OF FIGURE

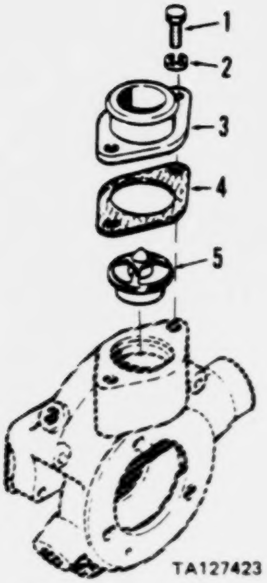
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Figure 27. Thermostat.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0503 WATER MANIFOLD,HEADERS, THERMOSTATS AND HOUSING GASKET	
				FIG. 27 THERMOSTAT	
1	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON	2
2	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	2
3	XBOZZ	10988	G2144	HOUSING, THERMOSTAT AND WATER OUTLET................................	1
4	PAOZZ	10988	G46907	GASKET...............................	1
5	PAOZZ	96906	MS35770-1	THERMOSTAT,FLOW CON..................	1

END OF FIGURE

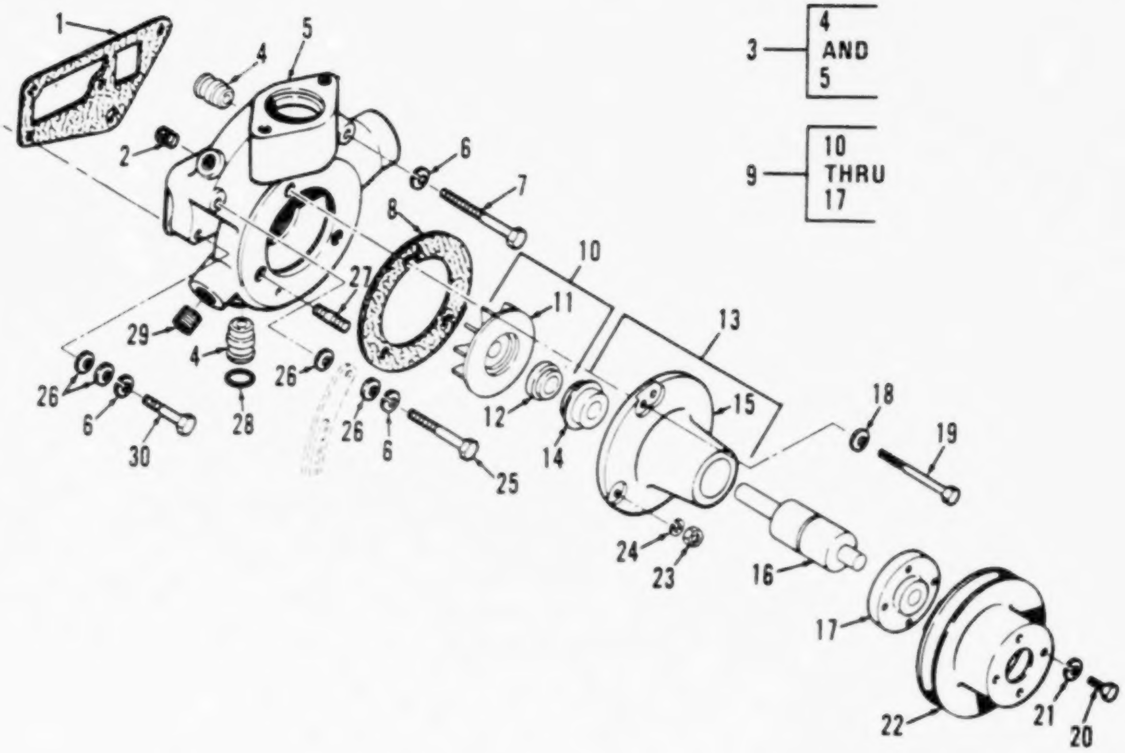
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Figure 28. Water pump.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0504 WATER PUMP	
				FIG. 28 WATER PUMP	
1	XDOZZ	10988	A38084	GASKET PART OF KIT P/N A155589......	1
2	PAFZZ	96906	MS49005-6	PLUG,PIPE..............................	1
3	XAFZZ	10988	A152801	BODY ASSEMBLY WATER PUMP...........	1
4	PAFZZ	10988	A152715	.SLEEVE,CLINCH,TUBE..................	1
5	XAFZZ	10988	A144046	.BODY, WATER PUMP....................	1
6	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	3
7	PAOZZ	96906	MS90725-69	SCREW,CAP,HEXAGON	1
8	PAOZZ	10988	A38083	GASKET PART OF KIT P/N A155589 PART OF KIT P/N A43198...................	1
9	PAFZZ	10988	A146584	KIT;WATER PUMP.......................	1
10	XAFZZ	10988	A37753	.PARTS KIT,ENGINE WA.................	1
11	XAFZZ	10988	A37754	..IMPELLER...........................	1
12	PAFZZ	10988	A34000	..SEAT ASSEMBLY,WATER................	1
13	XAFZZ	10988	A152312	.BODY ASSEMBLY WATER PUMP..........	1
14	PAFZZ	10988	A142499	..SEAL...............................	1
15	XAFZZ	10988	A37751	..BODY, WATER PUMP...................	1
17	XBFZZ	10988	A146537	.HUB.................................	1
18	PAOZZ	10988	A7085	WASHER,COPPER........................	1
19	PAOZZ	96906	MS90725-69	SCREW,CAP,HEXAGON H..................	1
20	PAFZZ	96906	MS90728-30	BOLT,MACHINE.........................	2
21	PAFZZ	96906	MS35338-45	WASHER,LOCK..........................	2
22	PAFZZ	10988	G11339	PULLEY,GROOVE........................	1
23	PAFZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	2
24	PAFZZ	96906	MS35338-46	WASHER,LOCK..........................	2
25	PAOZZ	96906	MS90725-70	SCREW,CAP,HEXAGON	1
26	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	2
27	PAFZZ	10988	A29433	STUD,PLAIN...........................	2
28	PAOZZ	10988	F62075	PACKING,PREFORMED PART OF KIT P/N A155589 PART OF KIT P/N A43198......	1
29	PAFZZ	81348	WW-P-471ACABUD	PLUG,PIPE............................	1
30	PAOZZ	96906	MS90725-67	SCREW,CAP,HEXAGON	1

END OF FIGURE

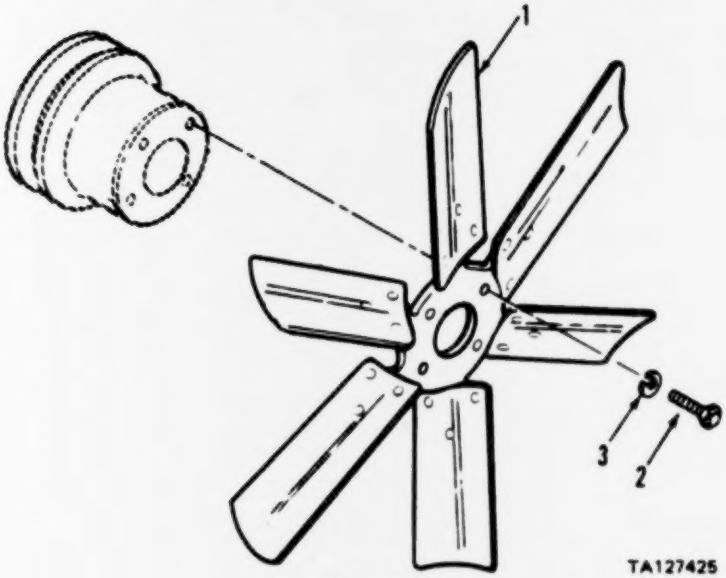
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Figure 29. Fan blade.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0505 FAN ASSEMBLY	
				FIG. 29 FAN BLADE	
1	PAOZZ	77890	1255DX	IMPELLER,FAN,AXIAL..................	1
2	PAOZZ	96906	MS90725-32	BOLT,MACHINE........................	4
3	PAOZZ	96906	MS35338-45	WASHER,LOCK.........................	4

END OF FIGURE

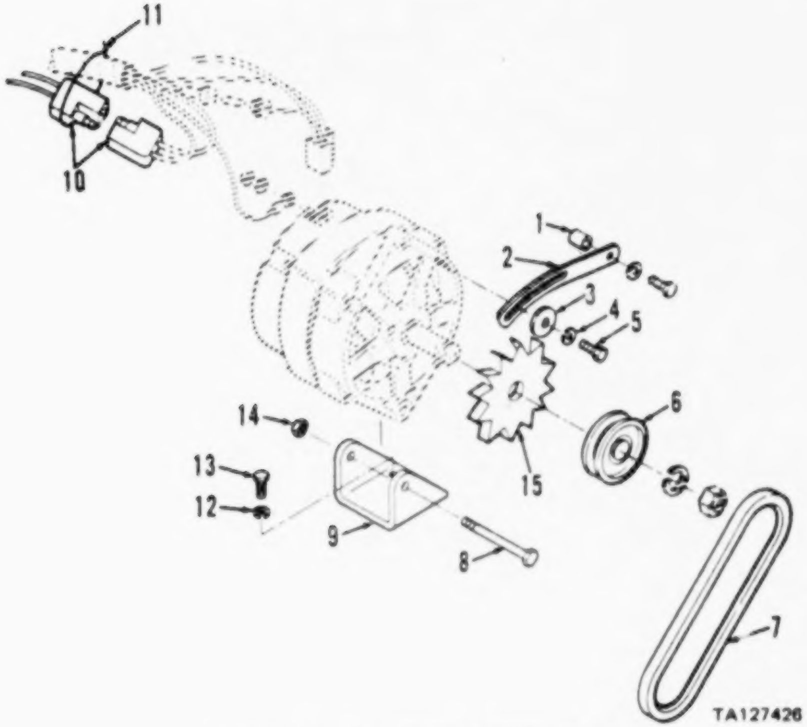
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Figure 30. Alternator and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 06 ELECTRICAL SYSTEM	
				GROUP 0601 GENERATOR,ALTERNATOR	
				FIG.30 ALTERNATOR AND MOUNTING	
1	XBOZZ	10988	G11271	SPACER................................	1
2	PAOZZ	10988	A34705	ARM,ADJUSTING,ENGIN ADJUST..........	1
3	PAOZZ	96906	MS27183-13	WASHER,FLAT..........................	1
4	PAOZZ	10988	892-1108	WASHER,SPRING TENSI..................	1
5	PAOZZ	10988	814-8025	SCREW,MACHINE........................	1
6	PAOZZ	16764	1961261	PULLEY,GROOVE........................	1
7	PAOZZ	14351	X27019494	BELT,V...............................	1
8	PAOZZ	96906	MS90725-70	SCREW,CAP,HEXAGON H..................	1
9	PAOZZ	10988	A160391	.BRACKET,ENGINE ACCE ALTERNATOR....	1
10	PAOZZ	79550	411724	SEMICONDUCTOR DEVIC..................	1
11	PAOZZ	06383	SST21-C0	STRAP,TIEDOWN,ELEC...................	10
12	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	2
13	PAOZZ	96906	MS18154-58	SCREW,CAP,HEXAGON H..................	2
14	PAOZZ	96906	MS51922-17	NUT,SELF-LOCKING,HE..................	1
15	PAOZZ	16764	800612	IMPELLER,FAN,CENTRI PULLEY..........	1

END OF FIGURE

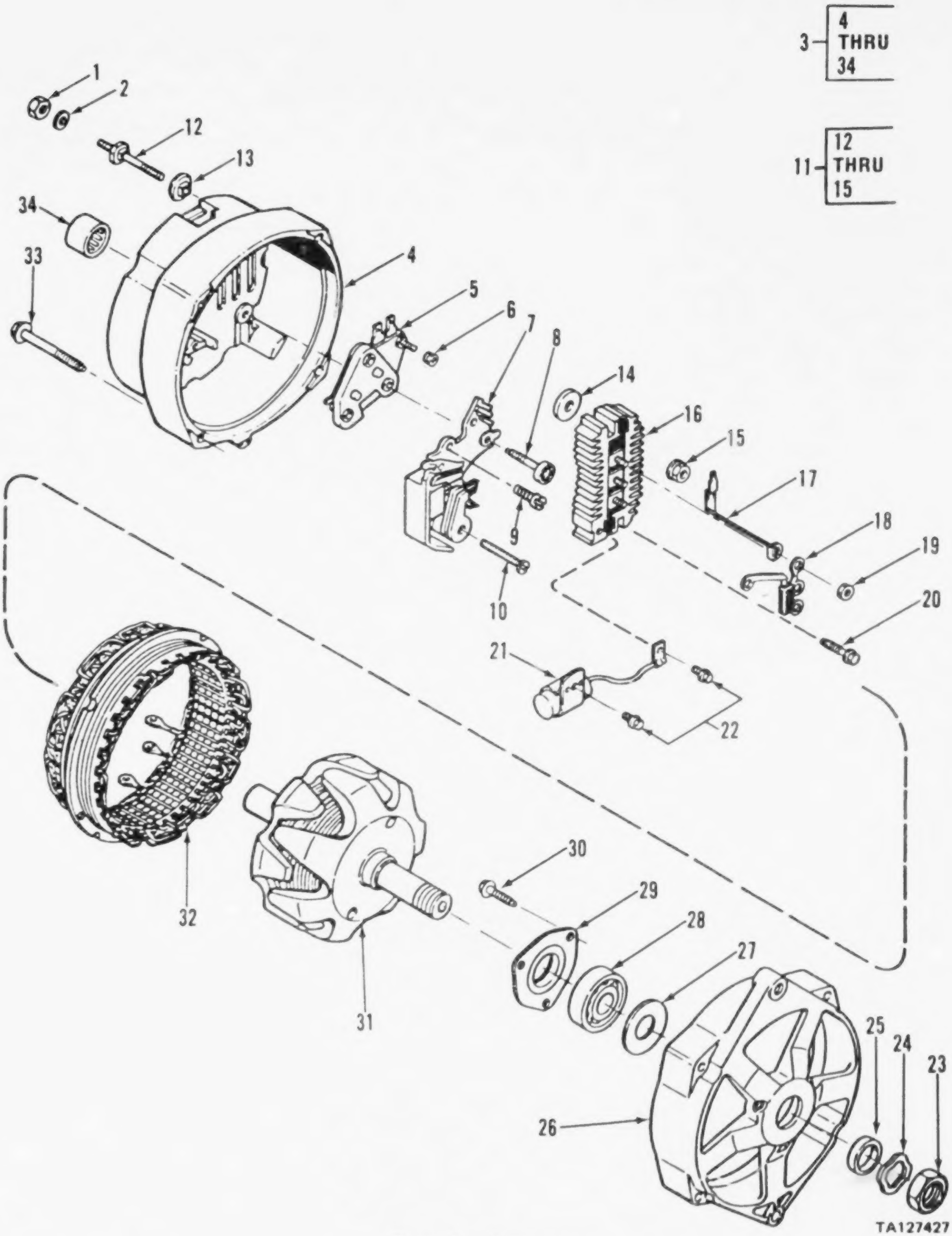
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Figure 31. Alternator.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0601 GENERATOR,ALTERNATOR	
				FIG. 31 ALTERNATOR	
1	PAOZZ	10988	825-1106	NUT,PLAIN...........................	1
2	PAOZZ	96906	MS35338-44	WASHER,LOCK.........................	1
3	PAOZZ	16764	1105510	GENERATOR,ALTERNATI.................	1
4	PAFFF	16764	1975718	.END BELL,ELECTRICAL................	1
5	PAFZZ	16764	1116388	.REGULATOR,ENGINE GE................	1
6	PAFZZ	16764	1851808	.NUT,PLAIN,ASSEMBLED................	1
7	PAFZZ	16764	1894559	.HOLDER ASSEMBLY,ELE................	
8	PAFZZ	16764	1876681	.SETSCREW...........................	2
9	PAFZZ	16764	1974020	.SETSCREW...........................	1
10	PAFZZ	16764	1894586	.SCREW WASHER.......................	1
11	PAFZZ	16764	1975471	.TERMINAL KIT PACKAGE...............	1
12	XBFZZ	16764	1974941	..STUD,TERMINAL.....................	1
13	XBFZZ	16764	1852059	..NUT,ASSEMBLY STUD, OUTER..........	1
14	PAFZZ	16764	801826	..INSULATOR,BUSHING STUD, INNER....	1
15	XBFZZ	16764	1975635	..NUT,ASSEMBLY......................	1
16	PAFZZ	16764	1891055	.RECTIFIER,SEMICONDU ASSEMBLY......	1
17	PAFZZ	16764	1894568	.TERMINAL,QUICK DISC................	1
18	PAFZZ	16764	1985348	.SEMICONDUCTOR DEVIC................	1
19	PAFZZ	96906	MS35649-282	.NUT,PLAIN,HEXAGON..................	3
20	PAFZZ	16764	1876668	.SCREW,ASSEMBLED WAS WASHER........	1
21	PAFZZ	16764	1971411	.CAPACITOR,FIXED,PAP................	1
22	PAFZZ	16764	1851612	.SCREW,TAPPING,THREA................	2
23	PAFZZ	16764	1915172	.NUT,PLAIN,HEXAGON..................	1
24	PAFZZ	16764	1941978	.WASHER,SPRING TENSI................	1
25	XBFZZ	16744	1976138	.COLLAR, SHAFT......................	1
26	XAFZZ	16764	1976808	.FRAME, DRIVE END...................	1
27	XBFZZ	16744	800832	.WASHER, GREASE SLINGER............	1
28	PAFZZ	16764	1974861	.BEARING,BALL,ANNULA................	1
29	PAFZZ	11862	1971993	PLATE...............................	1
30	PAFZZ	16764	1965104	.SCREW,MACHINE......................	3
31	XAFZZ	16764	1894597	.ROTOR..............................	1
32	PAFZZ	16764	1894594	.STATOR,ENGINE GENER................	1
33	XBFZZ	96906	MS35190-278	.SCREW,MACHINE......................	4
34	PAFZZ	16764	1974862	.BEARING,ROLLER,CYLI................	1

END OF FIGURE

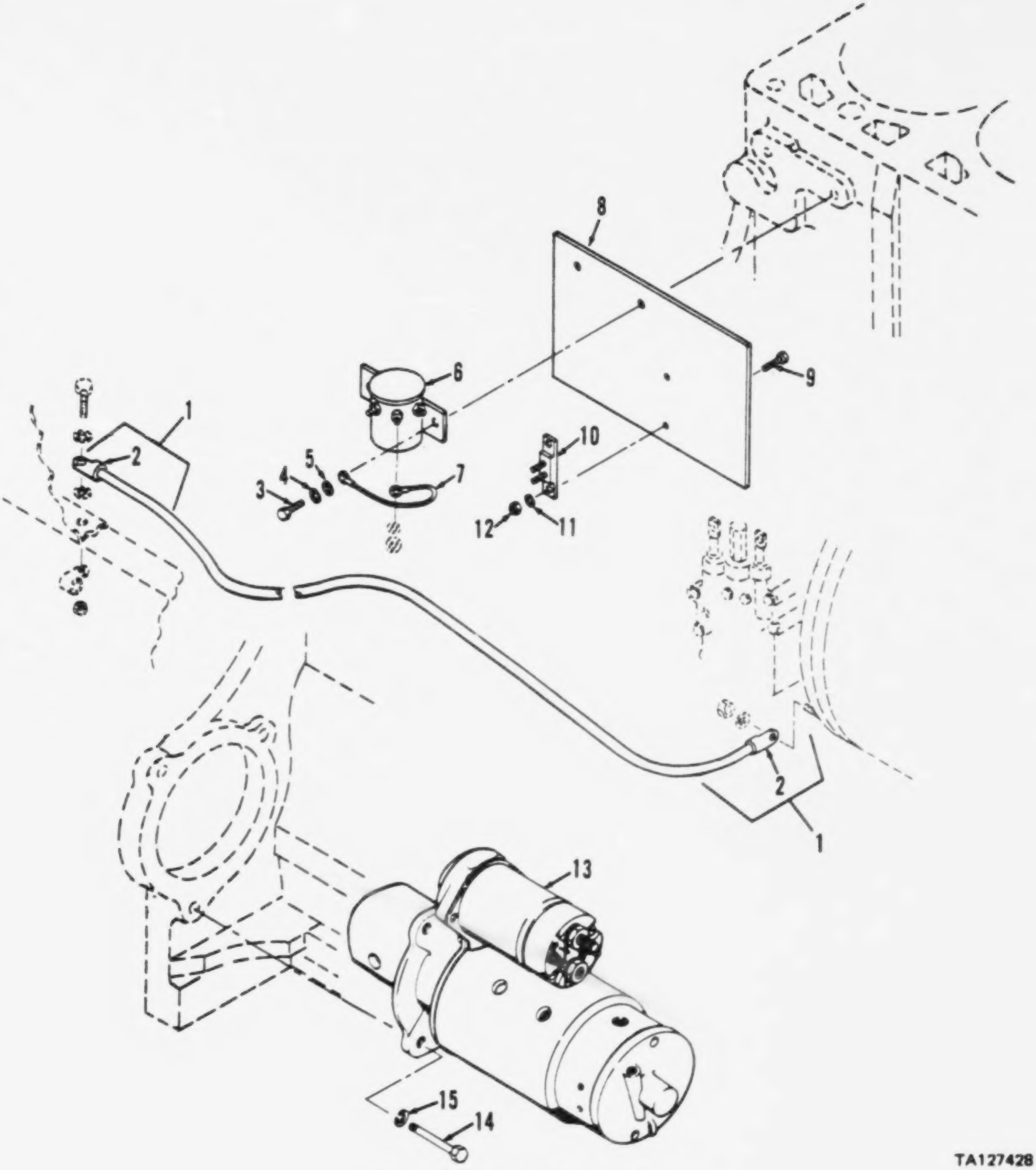
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Figure 32. Starter and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0603 STARTING MOTOR	
				FIG. 32 STARTER AND MOUNTING	
1	PAOZZ	10988	L40793	LEAD,ELECTRICAL......................	1
2	XAOZZ	81343	SAEB309	.TERMINAL, LUG......................	2
3	PAOZZ	96906	MS90725-6	SCREW,CAP,HEXAGON H.................	2
4	PAOZZ	96906	MS35338-44	WASHER,LOCK..........................	2
5	PAOZZ	96906	MS27183-11	WASHER,FLAT..........................	2
6	PAFZZ	16764	001481	RELAY,ELECTROMAGNET.................	1
7	PAOZZ	10988	A18311	LEAD,ELECTRICAL......................	1
8	XBOZZ	10988	L100766	PLATE, SOLENOID MOUNTING...........	1
9	PAOZZ	10988	169-77	SCREW,MACHINE.......................	2
10	PAOZZ	13445	30103-25	CIRCUIT BREAKER 25 AMPS............	1
11	PAOZZ	96906	MS35338-42	WASHER,LOCK..........................	2
12	PAOZZ	96906	MS35649-282	NUT,PLAIN,HEXAGON...................	2
13	PAOFF	16764	1109051	STARTER,MOTOR 24 VOLT..............	1
14	PAOZZ	96906	MS90725-66	SCREW,CAP,HEXAGON H.................	3
15	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	3

END OF FIGURE

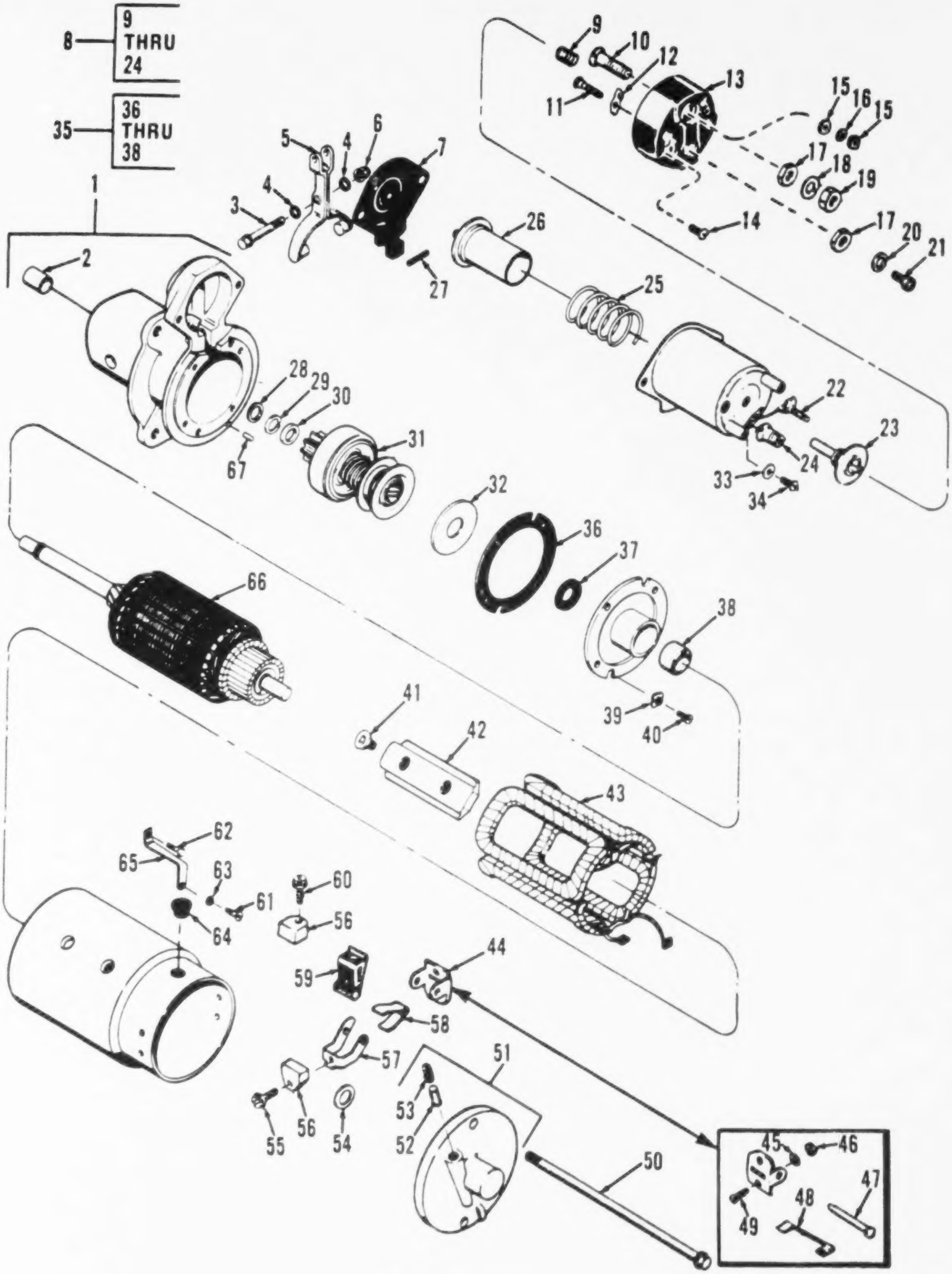
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Figure 33. Starter.

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(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0603 STARTING MOTOR	
				FIG. 33 STARTER	
1	PAFZZ	16764	801890	HOUSING,ENGINE,DRIV	1
2	PAFZZ	16764	1839345	.BEARING,SLEEVE	1
3	XDFZZ	16764	1941110	BOLT,SHOULDER	1
4	PAFZZ	16764	1970988	WASHER,SEALING	2
5	PAFZZ	16764	1919149	SHIFT LEVER ASSEMBL	1
6	PAFZZ	96906	MS51922-9	NUT,SELF-LOCKING,HE	1
7	PAFZZ	16764	1962601	BOOT,PLUNGER	1
8	PAFZZ	16764	1114390	SWITCH,ENGINE START	1
9	PAFZZ	16764	1917128	.SPRING,HELICAL,COMP COMPRESSION	1
10	PAFZZ	16764	1960244	.TERMINAL,STUD	1
11	XBFZZ	16764	1950069	.TERMINAL,STUD	2
12	XBFZZ	16764	1948202	.CONTACT	1
13	XAFZZ	16764	1877310	.COVER	1
14	PAFZZ	16764	453464	.SCREW,MACHINE	2
15	PAFZZ	96906	MS35649-282	.NUT,PLAIN,HEXAGON	4
16	XDFZZ	16764	1946143	.WASHER,LOCK	2
17	PAFZZ	96906	MS35691-17	.NUT,PLAIN,HEXAGON	2
18	PAFZZ	96906	MS35338-46	.WASHER,LOCK	1
19	PAFZZ	96906	MS51967-8	.NUT,PLAIN,HEXAGON	1
20	PAFZZ	16764	453435	.WASHER,LOCK	1
21	PAFZZ	16764	9427815	.BOLT,SELF-LOCKING	1
22	XBFZZ	16764	1949538	.TERMINAL CLIP	1
23	XBFZZ	16764	1952505	.CONTACT AND ROD	1
24	XBFZZ	16764	1955499	.TERMINAL,STUD	1
25	PAFZZ	16764	1958679	SPRING,HELICAL,COMP COMPRESSION	1
26	PAFZZ	16764	1941113	PLUNGER,SOLENOID	1
27	XDFZZ	16764	455106	PIN,SPRING	1
28	PAFZZ	16764	1928023	WASHER,FLAT	1
29	PAFZZ	16764	1928022	RING,RETAINING	1
30	PAFZZ	16764	1928021	BEARING,SLEEVE	1
31	PAFZZ	16764	1877313	DRIVE,ENGINE,ELECTR	1
32	XBFZZ	16764	821453	WASHER,FLAT	1
33	PAFZZ	96906	MS35338-44	WASHER,LOCK	2
34	PAFZZ	96906	MS35265-81	SCREW,MACHINE	2
35	PAFZZ	16764	1967566	PLATE ASSEMBLY	1
36	PAFZZ	16764	1962603	.GASKET	1
37	PAFZZ	16764	1937310	.SEAL,PLAIN ENCASED	1
38	PAFZZ	16764	1962606	.BEARING,SLEEVE	1
39	PAFZZ	96906	MS35338-43	WASHER,LOCK	2
40	PAFZZ	16764	1914580	SETSCREW	2
41	PAFZZ	16764	1968396	SCREW,MACHINE	8
42	PAFZZ	16764	1887021	POLE SHOE,STARTER	4
43	XAFZZ	16764	1960762	WINDING,MOTOR FIELD FIELD	1
44	PAFZZ	16764	1941075	PARTS KIT,BRUSH HOL	2
45	PAFZZ	96906	MS35338-43	.WASHER,LOCK	4
46	KBFZZ	16764	120361	.NUT	4
47	XDFZZ	16764	1940474	.PIN,STRAIGHT,HEADED	2
48	KBFZZ	16764	1852799	.LEAD ASSEMBLY	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
49	KBFZZ	16764	274738	.SCREW,MACHINE.......................	4
50	PAFZZ	16764	1960025	BOLT,SHOULDER........................	2
51	XAFFF	16764	1952603	FRAME ASSEMBLY.......................	1
52	XBFZZ	16764	1919851	.PACKING,OIL WICK....................	1
53	PAFZZ	19207	7402408	.SETSCREW............................	1
54	PAFZZ	16764	1914842	WASHER,FLAT..........................	1
55	PAFZZ	16764	274875	SCREW,TAPPING,THREA BRUSH, GROUND..	2
56	PAFZZ	24617	1946445	BRUSH,ELECTRICAL CO..................	2
57	PAFZZ	16764	1940477	HOLDER,ELECTRICAL C..................	2
58	PAFZZ	16764	1940475	SPRING...............................	2
59	PAFZZ	16764	1926618	HOLDER,ELECTRICAL C..................	2
60	PAFZZ	16764	1959514	SCREW,ASSEMBLED WAS BRUSH, INSULATED............................	2
61	PAFZZ	96906	MS35266-62	SCREW,MACHINE........................	1
62	PAFZZ	16764	9427815	BOLT,SELF-LOCKING....................	1
63	PAFZZ	96906	MS35338-43	WASHER,LOCK..........................	1
64	XBFZZ	16764	1955946	GROMMET..............................	1
65	XBFZZ	16764	1966821	CONNECTOR............................	1
66	PAFHH	16764	1969375	ARMATURE,MOTOR.......................	1
67	XBFZZ	16764	809593	PIN, STRAIGHT, HEADLESS............	1

END OF FIGURE

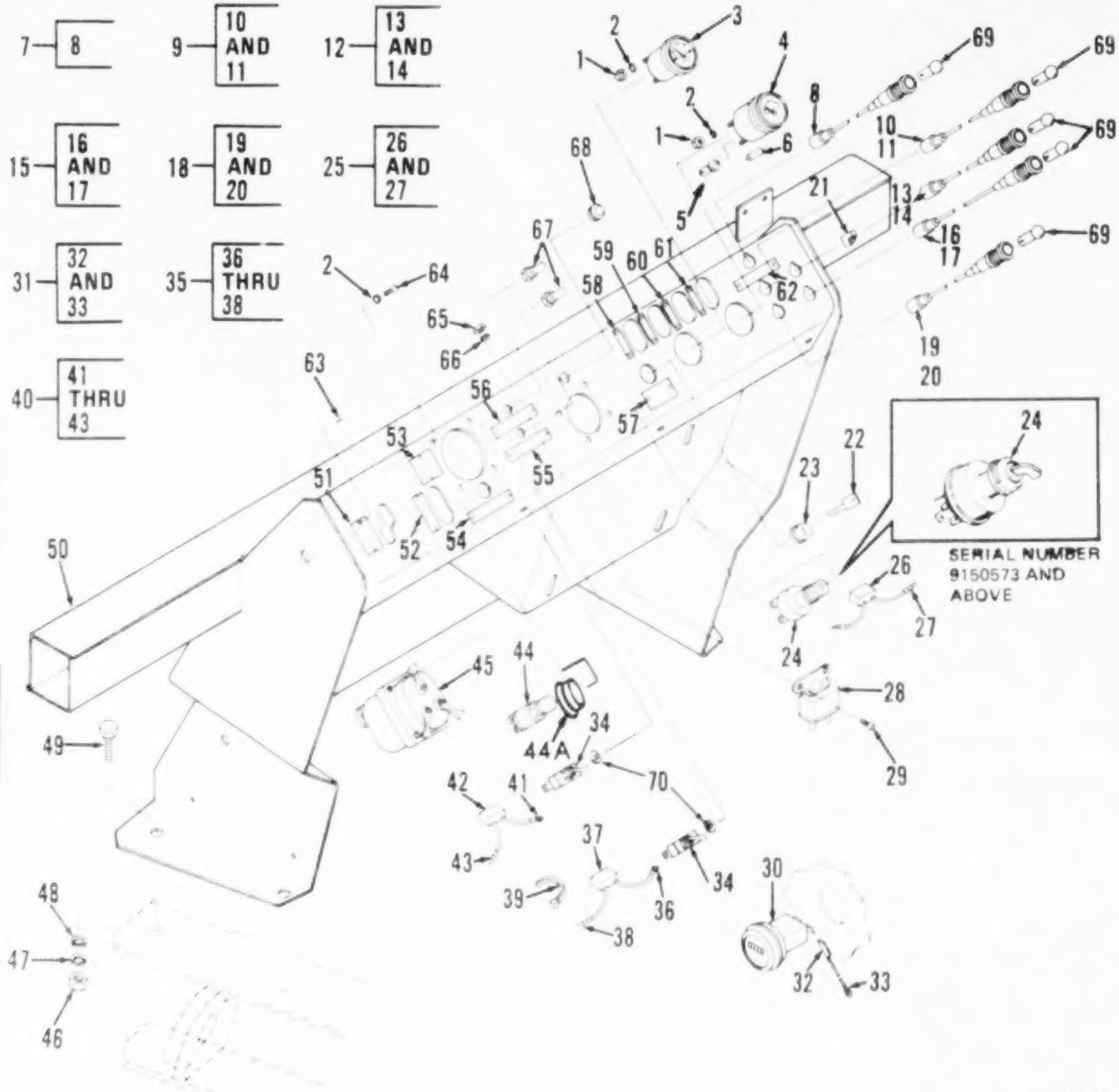
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Figure 34. Instrument panel.

GROUP 0607 INSTRUMENT OR CONTROL PANEL

FIG. 34 INSTRUMENT PANEL

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	96906	MS35649-262	NUT,PLAIN,HEXAGON	6
2	PAOZZ	96906	MS35338-43	WASHER,LOCK	6
3	PAOZZ	70040	6432376	GAGE,LIQUID QUANTIT	1
4	PAOZZ	70040	6464917	GAGE,PRESSURE,DIAL PRESSURE, 0-80 PSI	1
5	PAOZZ	08108	53	LAMP,INCANDESCENT	2
6	PAOZZ	10988	L73576	RESISTOR,FIXED,WIRE	6
7	PAOZZ	74400	19269	LIGHT,PANEL	1
8	XAOZZ	24617	2984528	.CONNECTOR	1
9	PAOZZ	74400	22051	LIGHT,INDICATOR TRANSMISSION TEMP	1
10	XAOZZ	77060	2973392	.CONNECTOR	1
11	XAOZZ	77060	2965867	.TERMINAL	1
12	PAOZZ	74400	20678	LIGHT,INDICATOR ENGINE OIL PRESSURE	1
13	XAOZZ	77060	2973392	.CONNECTOR	1
14	XAOZZ	77060	2965867	.TERMINAL	1
15	PAOZZ	74400	M4183	LIGHT,INDICATOR ALTERNATOR	1
16	XAOZZ	77060	2973392	.CONNECTOR NHA NSN 6210-00-006-9781	1
17	XAOZZ	77060	2965867	.TERMINAL	1
18	PAOZZ	74400	24107	LIGHT,INDICATOR ENGINE TEMP	1
19	XAOZZ	77060	2973392	.CONNECTOR	1
20	XAOZZ	77060	2965867	.TERMINAL	1
21	PAOZZ	79550	411724	SEMICONDUCTOR DEVIC	3
22	XBOZZ	77326	LS220	KEY, IGNITION SWITCH	1
23	XBOZZ	77326	LS105-6	NUT,TUBE COUPLING	1
24	PAOZZ	77326	31-243-B	SWITCH,LOCK,IGNITIO SN9150573 AND ABOVE	1
24	PAOZZ	77326	31-183	SWITCH,LOCK,IGNITIO SN 9150572 AND BELOW	1
25	PAOZZ	10988	L101994	CIRCUIT BREAKER ASSEMBLY, 6 AMP	1
26	PAOZZ	13445	30063-6	.CIRCUIT BREAKER	1
27	PAOZZ	16764	1878192	.TERMINAL,QUICK DISC	2
28	PAOZZ	88690	65-2570-1	CONTACT SET,RELAY	1
29	PAOZZ	10988	182-516	SCREW,MACHINE	2
30	PAOZZ	57733	24956	METER,TIME TOTALIZI	1
31	XBOZZ	10988	L102886	WIRE, LEAD, GROUND,	1
32	XAOZZ	81343	SAEB104	.TERMINAL, LUG	1
33	XAOZZ	81343	SAEB106	.TERMINAL, LUG	1
34	PAOZZ	96906	MS24523-22	SWITCH,TOGGLE	2
35	PAOZZ	10988	L101993	CIRCUIT BREAKER ASSEMBLY, 10 AMP	1
36	PAOZZ	15953	670074-9	.TERMINAL,LUG	1
37	PAOZZ	13445	30063-STK	.CIRCUIT BREAKER	1
38	PAOZZ	16764	1878192	.TERMINAL,QUICK DISC	1
39	PAOZZ	06383	SST2I-CO	STRAP,TIEDOWN,ELEC	10
40	PAOZZ	10988	L101974	CIRCUIT BREAKER ASSEMBLY, 6 AMP	1
41	PAOZZ	15953	670074-9	.TERMINAL,LUG	1
42	PAOZZ	13445	30063-6	.CIRCUIT BREAKER	1
43	PAOZZ	16764	1878192	.TERMINAL,QUICK DISC	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
44	PAOZZ	13445	90036	SWITCH,PUSH..............................	1
44A	PAOZZ	10988	L60490	BOOT,DUST AND MOIST..................	1
45	PAOZZ	96906	MS51113-1	SWITCH,VEHICULAR LT.................	1
46	PAOZZ	96906	MS51967-11	NUT,PLAIN,HEXAGON..................	4
47	PAOZZ	96906	MS35338-47	WASHER,LOCK..........................	4
48	PAOZZ	96906	MS27183-16	WASHER,FLAT..........................	8
49	PAOZZ	96906	MS90728-86	SCREW,CAP,HEXAGON H................	4
50	XBOZZ	10988	102780	PANEL, INSTRUMENT...................	1
51	XBOZZ	10988	L103934	PLATE, IDENTIFICATION, RANGE CONTROL................................	1
52	XBOZZ	10988	L103933	PLATE, IDENTIFICATION, SHIFT CONTROL................................	1
53	XBOZZ	10988	L103243	PLATE, IDENTIFICATION, VEHICLE LIGHTS..................................	1
54	XBOZZ	10988	L103931	PLATE, IDENTIFICATION, START........	1
55	XBOZZ	10988	L103930	PLATE, IDENTIFICATION, REAR FLOODLIGHT SWITCH....................	1
56	XBOZZ	10988	L103929	PLATE, IDENTIFICATION, FRONT FLOODLIGHT SWITCH....................	1
57	XBOZZ	10988	L103928	PLATE, IDENTIFICATION, IGNITION....	1
58	XBOZZ	10988	L103927	PLATE, IDENTIFICATION, ROTATE CONTROL................................	1
59	XBOZZ	10988	L103926	PLATE, IDENTIFICATION, SIDE SHIFT CONTROL................................	1
60	XBOZZ	10988	L103925	PLATE, IDENTIFICATION, LIFT CONTROL	1
61	XBOZZ	10988	L103924	PLATE, IDENTIFICATION, TILT CONTROL	1
62	XBOZZ	10988	L103923	PLATE IDENTIFICATION,HYDRAULIC FILTER LIGHT..........................	1
63	XBOZZ	10988	151-539	RIVET, POP............................	24
64	PAOZZ	10988	182-538	SCREW,MACHINE........................	4
65	PAOZZ	96906	MS35649-202	NUT,PLAIN,HEXAGON..................	2
66	PAOZZ	96906	MS35338-43	WASHER,LOCK..........................	2
67	PAOZZ	13445	81264	BOOT,DUST AND MOIST..................	2
68	XBOZZ	70485	AN931-B5-12	GROMMET, INSTRUMENT PANEL..........	1
69	PAOZZ	08806	1895R	LAMP,INCANDESCENT...................	5
70	PAOZZ	13445	88564	WASHER,KEY...........................	2

END OF FIGURE

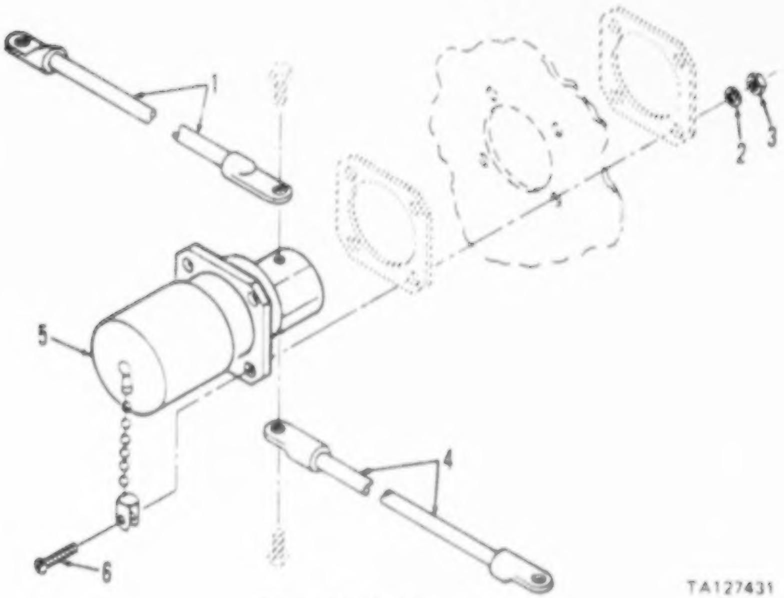
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Figure 35. Slave receptacle.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0608 MISCELLANEOUS ITEMS	
				FIG. 35 SLAVE RECEPTACLE	
1	PAOZZ	10988	L103019	CABLE ASSY,SPECIAL RECEPTACLE TO GROUND..................................	1
2	PAOZZ	96906	MS27183-9	WASHER,FLAT...........................	4
3	PAOZZ	96906	MS35649-202	NUT,PLAIN,HEXAGON.....................	4
4	PAOZZ	10988	L103017	CABLE ASSY,SPECIAL RECEPTACLE TO STARTER................................	1
5	PAOZZ	96906	MS52131-1	CONNECTOR,PLUG,ELEC RECEPTACLE, ELECTRICAL, SLAVE....................	1
6	PAOZZ	10988	182-187	SCREW,MACHINE.........................	4

END OF FIGURE

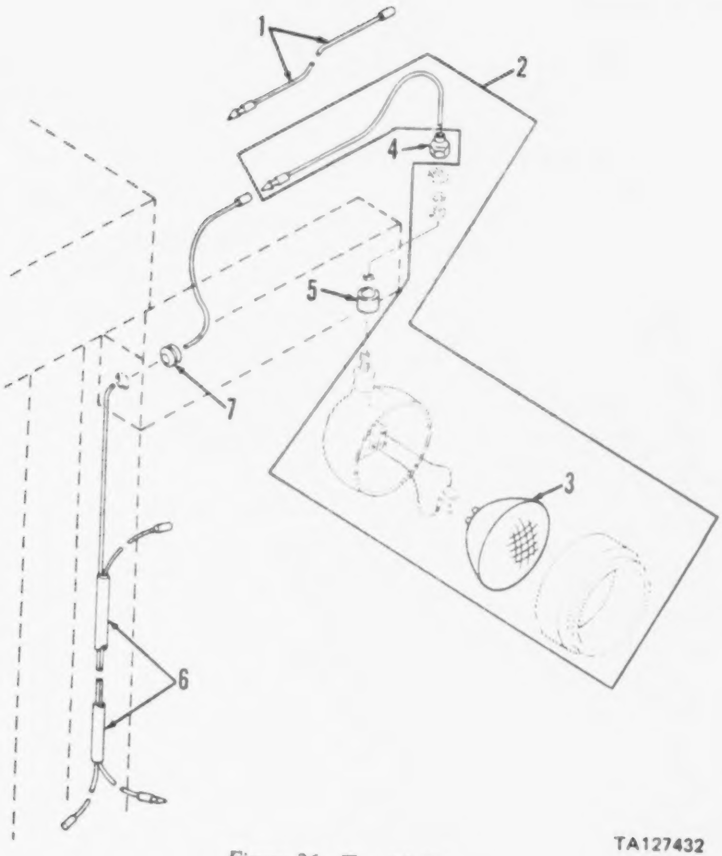
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Figure 36. Flood lights.

GROUP 0609 LIGHTS

FIG. 36 FLOOD LIGHTS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	XBOZZ	10988	L102873	WIRE, ROPS, RH	1
2	PAOZZ	40441	EX-709	FLOODLIGHT,ELECTRIC	6
3	PAOZZ	24455	4578	.LAMP,INCANDESCENT WATTS	1
4	PAOZZ	97539	MN-10308	BOOT,DUST AND MOIST	2
5	PAOZZ	10988	D55273	RUBBER ROUND SECTIO	2
6	XBOZZ	10988	L102885	LEAD ASSEMBLY, ROPS	1
7	XBOZZ	70465	2335	GROMMET, ROPS	2

END OF FIGURE

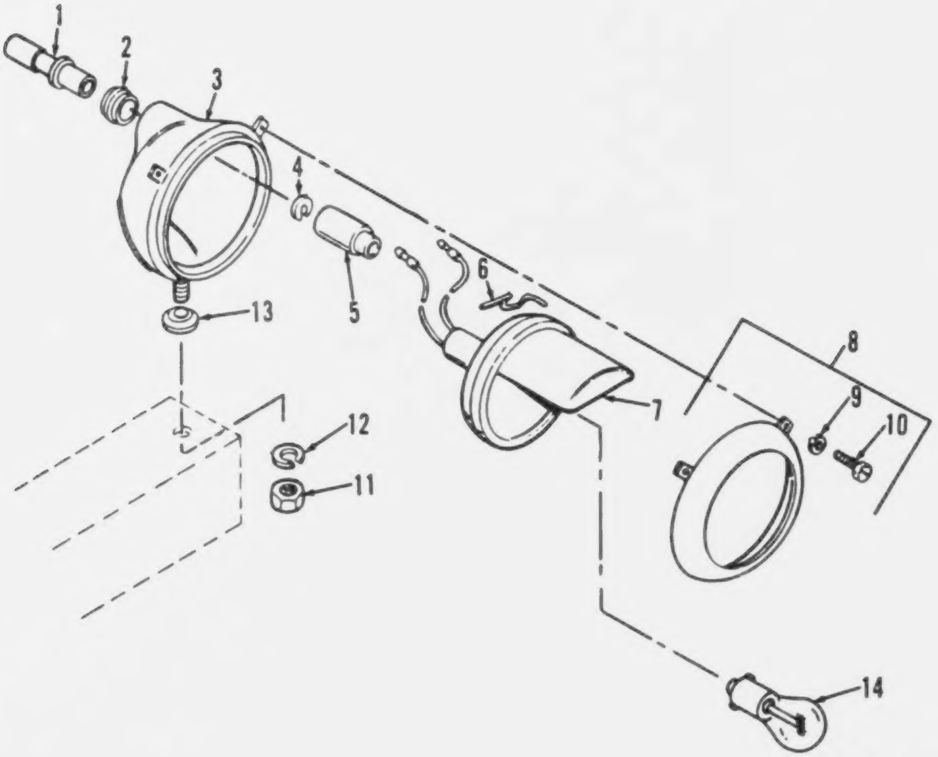
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Figure 37. Black out driving lamp.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0609 LIGHTS	
				FIG. 37 BLACK OUT DRIVING LAMP	
	PAOOO	16528	1030004	HEADLIGHT DRIVING..................	1
1	PAOZZ	19207	8741492	.ADAPTER,CONNECTOR..................	1
2	PAOZZ	19207	8741442	.GROMMET,NONMETALLIC................	1
3	XAOZZ	19207	8747986	.HOUSING,HEADLIGHT..................	1
4	PAOZZ	19207	8338567	.WASHER,SLOTTED.....................	1
5	PAOZZ	19207	8338566	.SHELL,ELECTRICAL CO................	1
6	PAOZZ	19207	7320711	.CLIP,RETAINING.....................	3
7	XAOZZ	19207	8747987	.LAMP UNIT,VEHICULAR WIRING ASSY...	1
8	PAOZZ	19207	7525940	.DOOR,BLACKOUT LAMP.................	1
9	PAOZZ	19207	7320642	..RING,RETAINING....................	3
10	PAOZZ	19207	7525938	..SCREW,MACHINE.....................	3
11	PAOZZ	96906	MS51967-8	.NUT,PLAIN,HEXAGON..................	1
12	PAOZZ	96906	MS35338-46	.WASHFR,LOCK........................	1
13	PAOZZ	19207	5294507	.WASHER,FINISHING...................	1
14	PAOZZ	08806	1683	LAMP,INCANDESCENT..................	1

END OF FIGURE

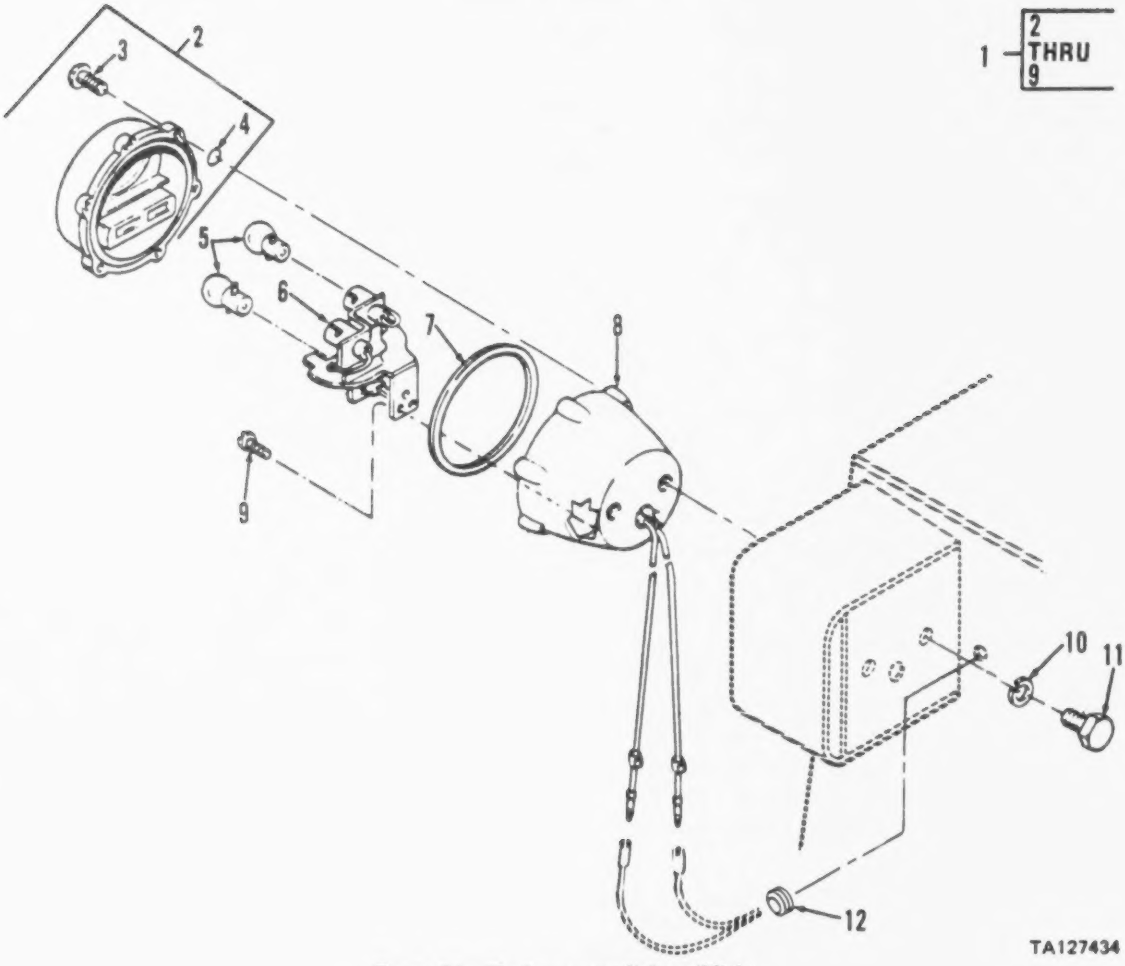
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Figure 38. Black out stop light-tail light.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0609 LIGHTS	
				FIG. 38 BLACK OUT STOP LIGHT-TAIL LIGHT	
1	PAOZZ	96906	MS51330-1	STOP LIGHT-TAILLIGH -TAIL-LIGHT, 24 -VOLT	2
2	PAOZZ	19207	7526018	.DOOR ASSEMBLY,BLACK	1
3	PAOZZ	19207	7320641	..SCREW,MACHINE	6
4	PAOZZ	19207	7320642	..RING,RETAINING	6
5	PAOZZ	24617	190877	.LAMP,INCANDESCENT	2
6	XAOZZ	19207	8378662	.LAMPHOLDER ASSEMBLY ASSEMBLY	1
7	PAOZZ	19207	7320658	.PACKING,PREFORMED	1
8	XAOZZ	96906	MS53047-1	.LIGHT,MARKER,CLEARA	1
9	PAOZZ	96906	MS35206-243	.SCREW,MACHINE	3
10	PAOZZ	96906	MS35338-46	WASHER,LOCK	4
11	PAOZZ	96906	MS18154-58	SCREW,CAP,HEXAGON H	4
12	PAOZZ	70485	316	GROMMET,NONMETALLIC	2

END OF FIGURE

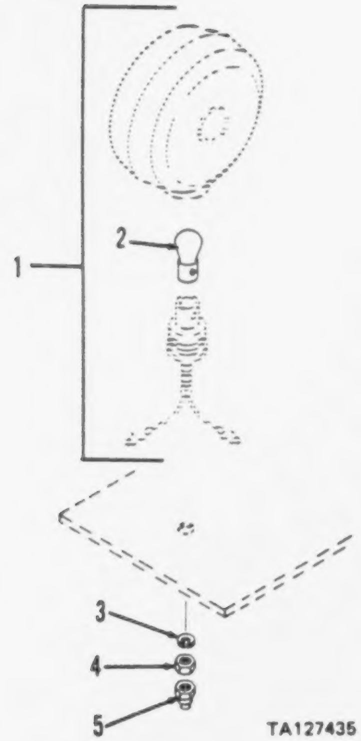
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Figure 39. Stop and tail light.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0609 LIGHTS	
				FIG. 39 STOP AND TAIL LIGHT	
1	PAOZZ	74400	26418	LAMP UNIT,VEHICULAR TAILLIGHT......	2
2	PAOZZ	08108	1662	.LAMP,INCANDESCENT..................	1
3	PAOZZ	96906	MS35338-48	WASHER,LOCK.........................	2
4	PAOZZ	96906	MS51968-14	NUT,PLAIN,HEXAGON...................	2
5	PAOZZ	97539	MN-1030B	BOOT,DUST AND MOIST.................	2

END OF FIGURE

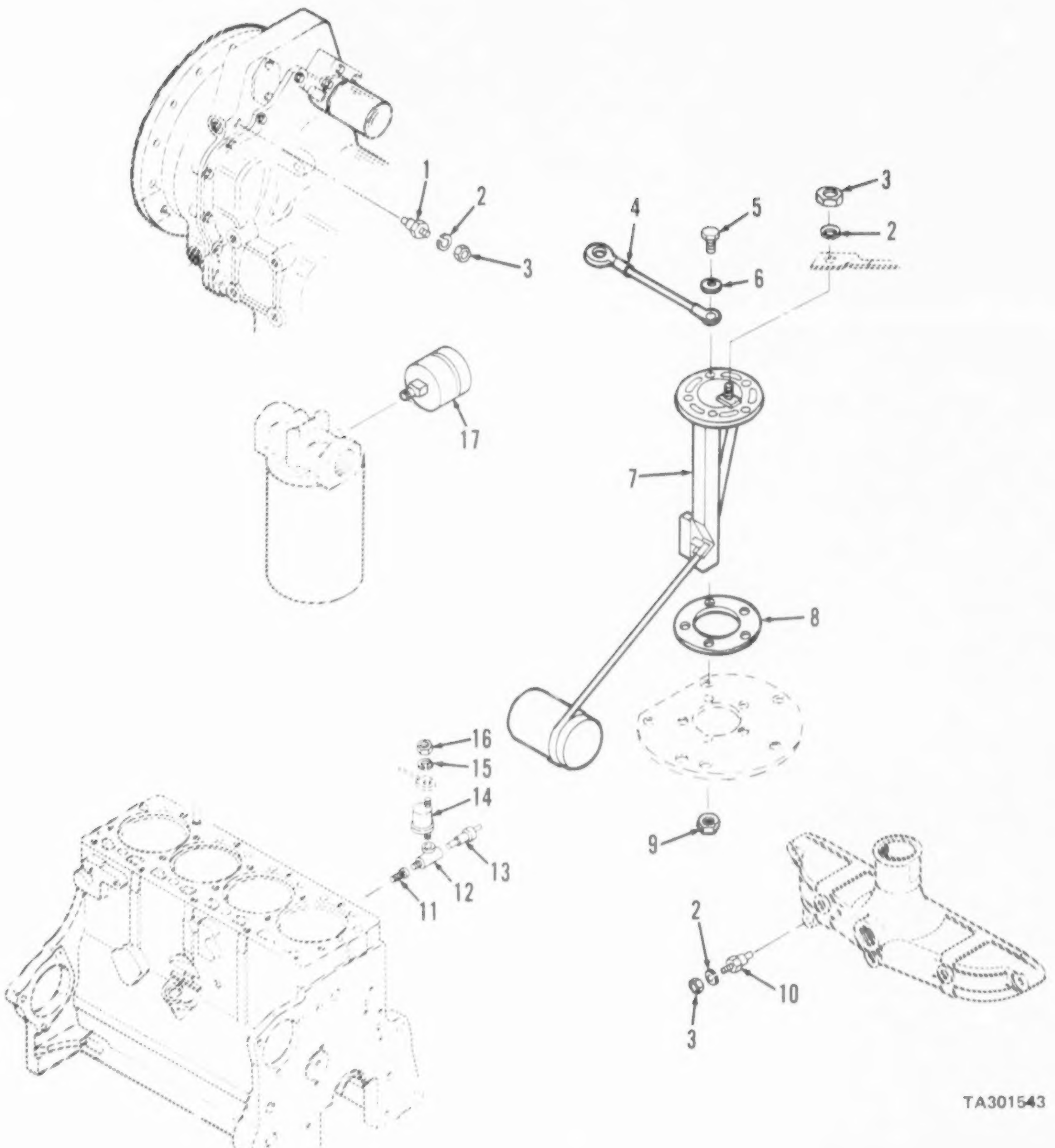
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Figure 40. Sending units.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0610 SENDING UNITS AND WARNING SWITCHES	
				FIG. 40 SENDING UNITS	
1	PAOZZ	70040	6402722	SWITCH,THERMOSTATIC TRANSMISSION TEMPERATURE, 265F....................	1
2	PAOZZ	96906	MS35338-43	WASHER,LOCK..........................	3
3	PAOZZ	96906	MS35650-302	NUT,PLAIN,HEXAGON....................	3
4	PAOZZ	10988	A31060	LEAD,ELECTRICAL......................	1
5	PAOZZ	96906	MS35190-272	SCREW,MACHINE........................	5
6	PAOZZ	10988	L77590	GASKET...............................	5
7	PAOZZ	70040	6426395	TRANSMITTER,LIQUID TANK..............	1
8	PAOZZ	10988	A11822	.GASKET..............................	1
9	PAOZZ	96906	MS17829-3C	NUT,SELF-LOCKING,HE..................	5
10	PAOZZ	70040	6402719	SWITCH,THERMOSTATIC..................	1
11	XBOZZ	10988	217-1	FITTING..............................	1
12	PAOZZ	10988	221-1690	TEE,PIPE.............................	1
13	PAOZZ	70040	6460392	SWITCH,PRESSURE......................	1
14	PAOZZ	70040	6460032	SWITCH,PRESSURE......................	1
15	PAOZZ	96906	MS35338-43	WASHER,LOCK..........................	1
16	PAOZZ	96906	MS35650-302	NUT,PLAIN,HEXAGON....................	1
17	PAOZZ	10988	H342774	SWITCH,PRESSURE FILTER...............	1

END OF FIGURE

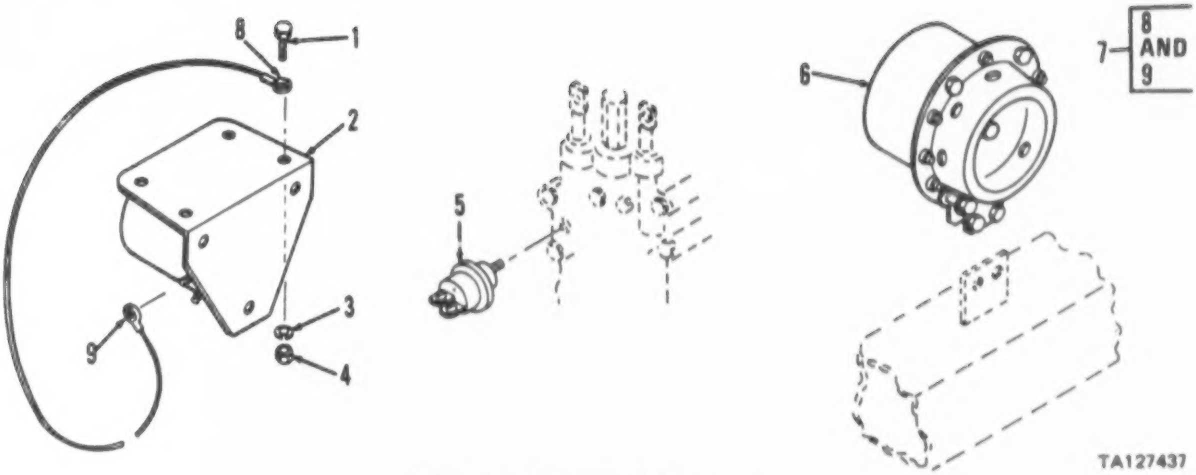
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Figure 41. Horn and back-up alarm.

GROUP 0611 HORN,SIREN

FIG. 41 HORN AND BACK-UP ALARM

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H	2
2	PAOOO	57013	0-050014-0	HORN,ELECTRICAL	1
3	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
4	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
5	PAOZZ	74400	M4010	SWITCH,PRESSURE ALARM	1
6	PAOZZ	96906	MS51074	HORN,ELECTRICAL	1
7	PAOZZ	10988	L16409	CABLE ASSY,SPECIAL GROUNDING	1
8	XAOZZ	81343	SAEB107	.TERMINAL, LUG	1
9	XAOZZ	81343	SAEB104	.TERMINAL, LUG	1

END OF FIGURE

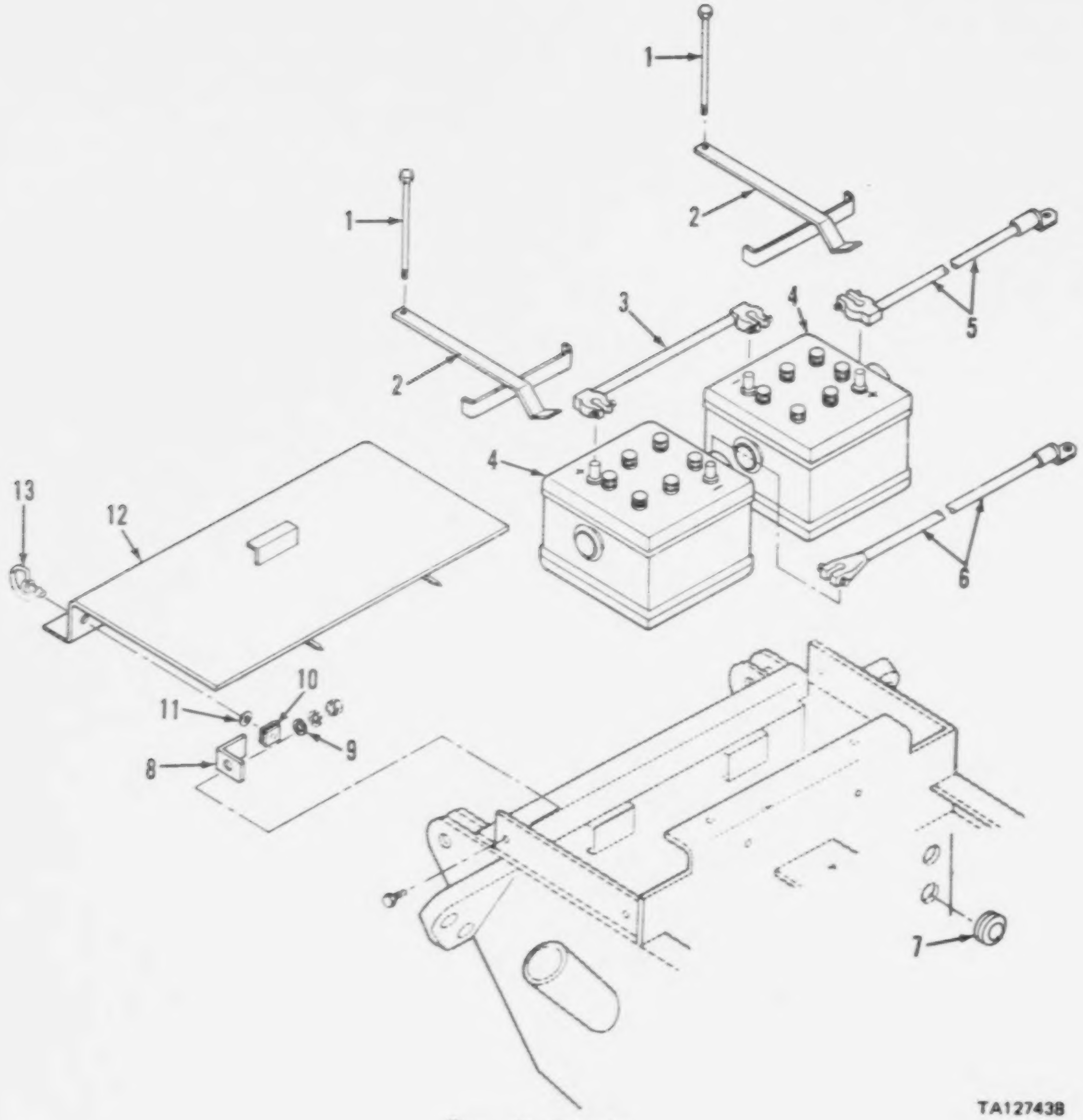
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Figure 42. Batteries.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0612 BATTERIES,STORAGE(WET OR DRY)	
				FIG. 42 BATTERIES	
1	PAOZZ	96906	MS90725-50	BOLT,MACHINE	2
2	PAOZZ	10988	L104717	BRACKET,EYE,NONROTA	2
3	PAOZZ	10988	L103015	CABLE ASSY,SPECIAL BATTERY	1
4	PAOFA	96906	MS35000-3	BATTERY,STORAGE	2
5	PAOZZ	10988	L100862	CABLE ASSY,SPECIAL STARTER	1
6	PAOZZ	10988	L14542	LEAD,STORAGE BATTER GROUND	1
7	XBOZZ	76385	Z440	GROMMET	2
8	XBOZZ	10988	L103476	BRACKET, RECEPTACLE	2
9	PAOZZ	96906	MS27183-19	WASHER,FLAT	2
10	PAOZZ	94222	85-47-101-15	RECEPTACLE,TURNLOCK	2
11	PAOZZ	94222	85-34-101-20	WASHER,SPLIT	2
12	XBOZZ	10988	L101755	COVER, BATTERY	1
13	XBOZZ	94222	85-15-300-16	STUD, TURNLOCK FASTENER	2

END OF FIGURE

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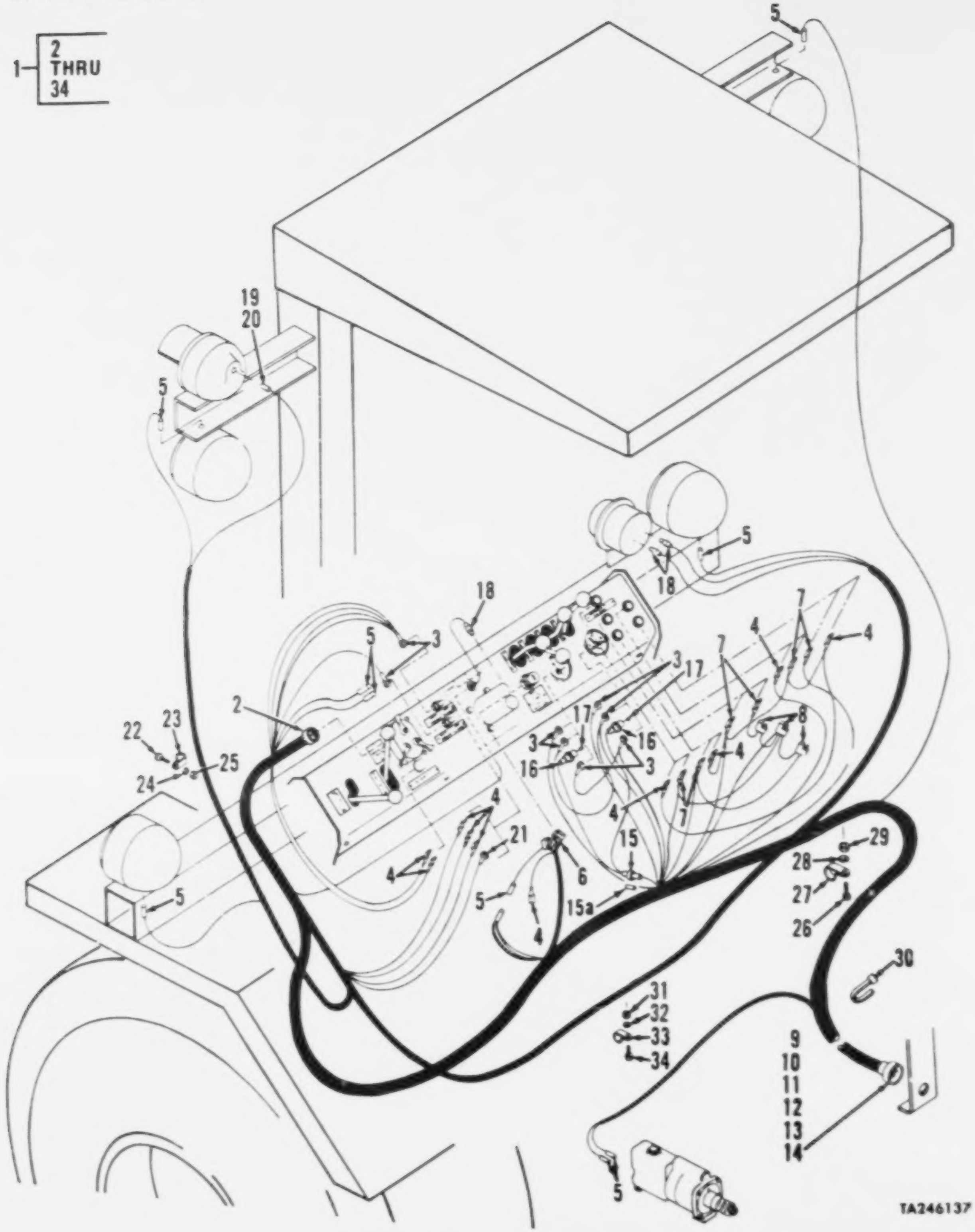
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Figure 43. Front main wiring harness.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0613 HULL OR CHASSIS WIRING HARNESS	
				FIG. 43 FRONT MAIN WIRING HARNESS	
1	PAOZZ	10988	L103016	WIRING HARNESS,BRAN FRONT, MAIN....	1
2	PAOZZ	77820	SG3106-E28-51S	.CONNECTOR,PLUG,ELEC.................	1
3	PAOZZ	81205	BACT12B301	.TERMINAL,LUG........................	8
4	PAOZZ	77060	2965142	.TERMINAL,QUICK DISC.................	12
5	XBOZZ	81343	SAETYPE10-156DIA 12-20AWG	.TERMINAL............................	10
6	PAOZZ	77060	2984017	.CONNECTOR BODY,PLUG.................	1
7	XBOZZ	77060	2965467	.CONNECTOR, FEMALE...................	8
8	PAOZZ	79550	411724	.SEMICONDUCTOR DEVIC.................	3
9	PAOZZ	11139	112263-90	.NUT,PLAIN,HEXAGON...................	6
10	XBOZZ	99699	114017	.PLUG................................	1
11	PAOZZ	11139	112264	.WASHER,LOCK.........................	1
12	XBOZZ	99699	HD54-24-19PN	.CONNECTOR RECEPTACLE...............	1
13	XBOZZ	99699	0460-201-1690	.SOCKET..............................	13
14	PAOZZ	11139	112349	.CONTACT,ELECTRICAL..................	5
15	PAOZZ	75915	155-120	.FUSEHOLDER,EXTRACT..................	1
15A	PAOZZ	91637	SPR-1014400HM10%	.RESISTOR,FIXED,WIRE.................	1
16	PAOZZ	77060	2984323	.LAMPHOLDER..........................	2
17	PAOZZ	77060	5297062	.CONTACT,ELECTRICAL..................	2
18	PAOZZ	96906	MS27144-2	.CONNECTOR,PLUG,ELEC.................	3
19	XBOZZ	77060	2971962	.CONNECTOR, MALE.....................	1
20	XBOZZ	77060	2973392	.CONNECTOR, TERMINAL.................	1
21	XBOZZ	81343	SAEB104	.TERMINAL, LUG.......................	1
22	PAOZZ	96906	MS90725-6	.SCREW,CAP,HEXAGON H.................	4
23	PAOZZ	75272	COV0413	.CLAMP,LOOP..........................	4
24	PAOZZ	96906	MS35338-44	WASHER,LOCK..........................	4
25	PAOZZ	96906	MS51967-2	.NUT,PLAIN,HEXAGON...................	4
26	PAOZZ	96906	MS90725-6	.SCREW,CAP,HEXAGON H.................	3
27	PAOZZ	10988	49855	.CLAMP,LOOP..........................	3
28	PAOZZ	96906	MS35338-44	.WASHER,LOCK.........................	3
29	PAOZZ	96906	MS51967-2	.NUT,PLAIN,HEXAGON...................	3
30	PAOZZ	06383	SST2I-C0	.STRAP,TIEDOWN,ELECT.................	6
31	PAOZZ	96906	MS51967-2	.NUT,PLAIN,HEXAGON...................	3
32	PAOZZ	96906	MS35338-44	.WASHER,LOCK.........................	3
33	XDOZZ	10988	49854	.CLAMP,LOOP..........................	3
34	PAOZZ	96906	MS90725-6	.SCREW,CAP,HEXAGON H.................	3

END OF FIGURE

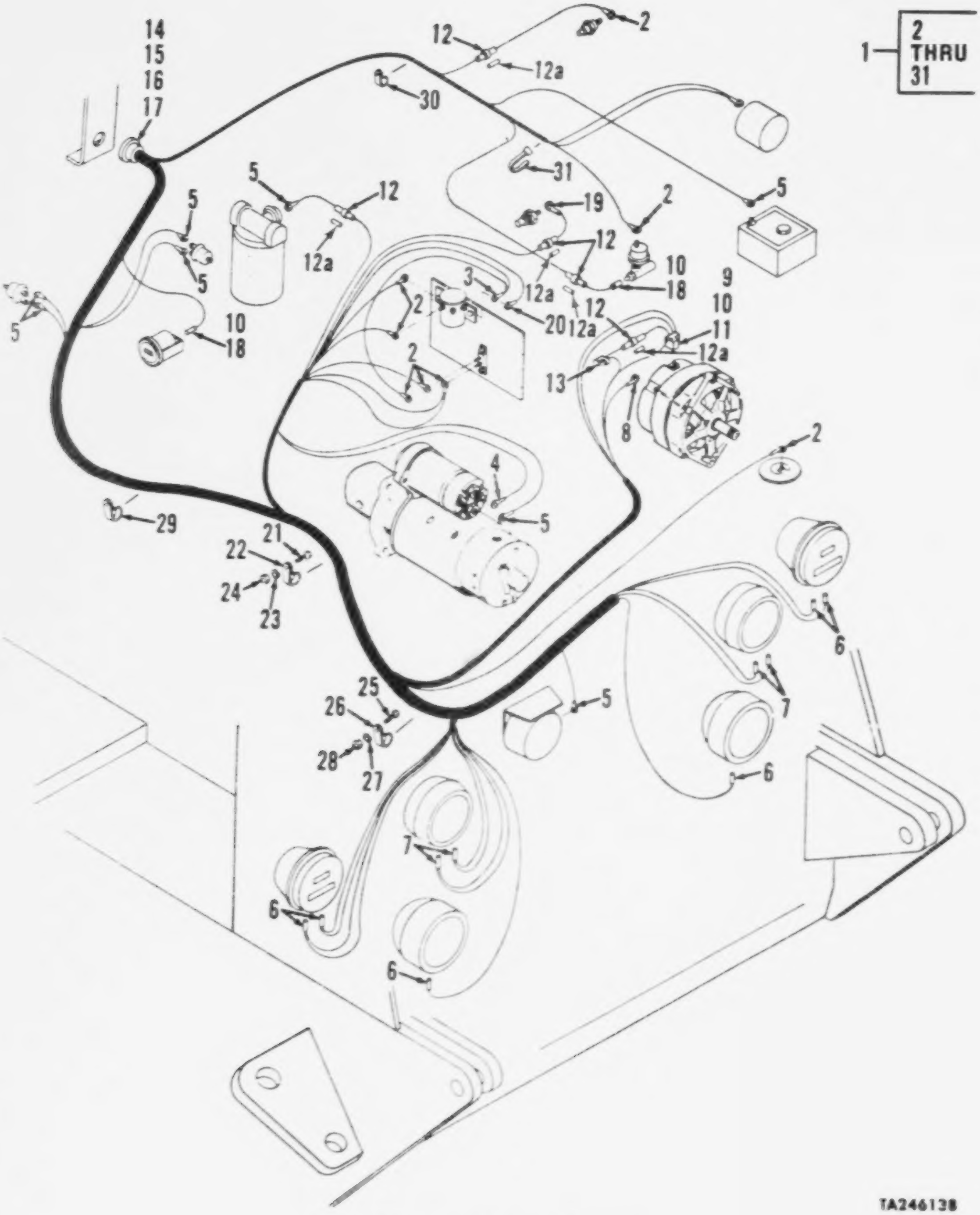
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Figure 44. Rear main wiring harness.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0613 HULL OR CHASSIS WIRING HARNESS	
				FIG. 44 REAR MAIN WIRING HARNESS	
1	PAOZZ	10988	L60834	WIRING HARNESS,BRAN....................	1
2	XBOZZ	81343	SAEB104	.TERMINAL LUG..........................	7
3	XBOZZ	81343	SAEB207	.TERMINAL, LUG.........................	1
4	XBOZZ	81343	SAEB107	.TERMINAL LUG..........................	2
5	PAOZZ	59730	RB2237	.TERMINAL,LUG..........................	8
6	XBOZZ	81343	SAETYPE10-156DIA12-20AWG	.TERMINAL..............................	6
7	XBOZZ	81343	SAETYPE1-180DIA12-20AWG	.TERMINAL..............................	4
8	XBOZZ	81343	SAEB305	.TERMINAL,LUG..........................	1
9	XBOZZ	77060	2965164	.CONNECTOR.............................	1
10	PAOZZ	77060	2965142	.TERMINAL,QUICK DISC...................	4
11	XBOZZ	77060	2965467	.CONNECTOR, FEMALE.....................	1
12	PAOZZ	75915	155-120	.FUSEHOLDER,EXTRACT....................	1
12A	PAOZZ	10988	L73576	.RESISTOR,FIXED,WIRE...................	6
13	PAOZZ	79550	411724	.SEMICONDUCTOR DEVIC...................	1
14	XBOZZ	99699	0461-201-1690	.SOCKET................................	13
15	PAOZZ	11139	112352	.CONTACT,ELECTRICAL....................	1
16	XBOZZ	99699	HD56-24-19SN	.PLUG..................................	1
17	XBOZZ	99699	114017	.PLUG..................................	1
18	PAOZZ	11862	2962793	.CAPACITOR,FIXED,PAP...................	2
19	XBOZZ	81343	SAEB203	.TERMINAL, LUG.........................	1
20	XBOZZ	81343	SAEB306	.TERMINAL, LUG.........................	1
21	PAOZZ	96906	MS90725-62	.SCREW,CAP,HEXAGON H...................	1
22	PAOZZ	10988	040471	.CLAMP,LOOP............................	1
23	PAOZZ	96906	MS35338-46	.WASHER,LOCK...........................	1
24	PAOZZ	96906	MS51967-8	.NUT,PLAIN,HEXAGON.....................	1
25	PAOZZ	96906	MS18154-60	.SCREW,CAP,HEXAGON H...................	2
26	PAOZZ	75272	COV0913	.CLAMP,LOOP............................	4
27	PAOZZ	96906	MS35338-46	.WASHER,LOCK...........................	2
28	PAOZZ	96906	MS51967-8	.NUT,PLAIN,HEXAGON.....................	2
29	PAOZZ	10988	49858	.CLAMP,LOOP............................	2
30	PAOZZ	10988	49859	.CLAMP,LOOP............................	1
31	PAOZZ	06383	SST2I-C0	.STRAP,TIEDOWN,ELECT...................	2

END OF FIGURE

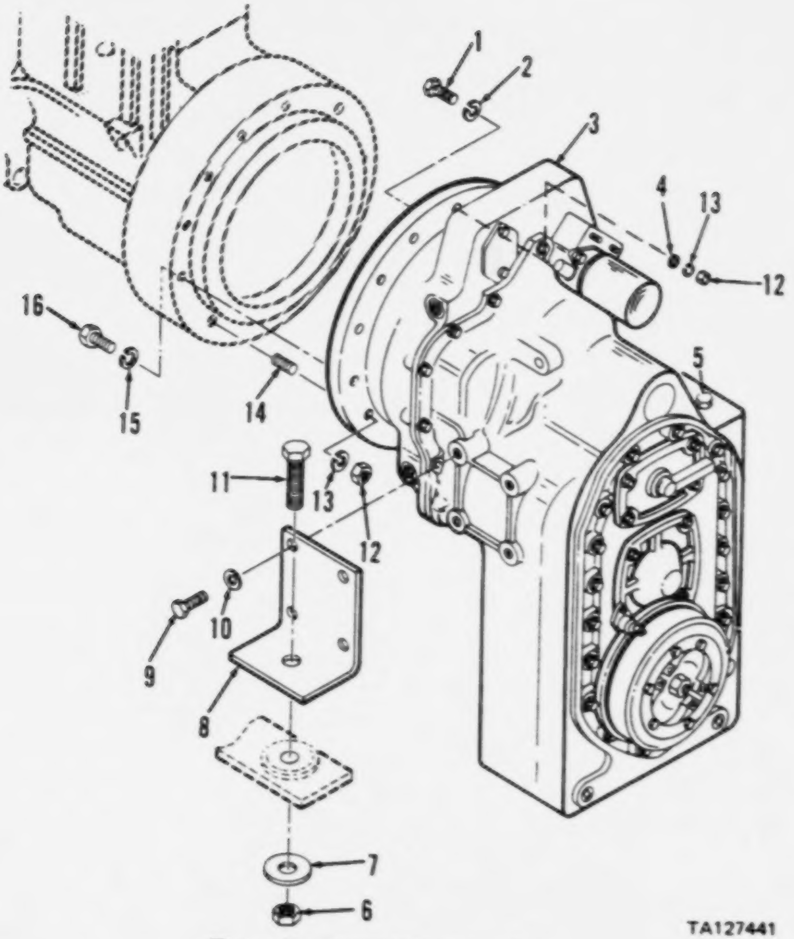
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Figure 45. Transmission mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 07 TRANSMISSION	
				GROUP 0700 TRANSMISSION ASSEMBLY	
				FIG. 45 TRANSMISSION MOUNTING	
1	PAOZZ	96906	MS90725-65	SCREW,CAP,HEXAGON H..................	10
2	PAOZZ	96906	MS35338-46	WASHER,LOCK...........................	10
3	PAFHD	12603	286223	TRANSMISSION,HYDRAU...................	1
4	PAOZZ	96906	MS27183-15	WASHER,FLAT...........................	1
5	PAOZZ	03958	MS49005-10	PLUG,PIPE.............................	1
6	PAOZZ	96906	MS51922-57	NUT,SELF-LOCKING,HE...................	2
7	XDOZZ	10988	A19068	WASHER,FLAT...........................	2
8	XBOZZ	10988	L101486	MOUNT, TRANSMISSION...................	2
9	PAOZZ	96906	MS90728-185	SCREW,CAP,HEXAGON H..................	8
10	XDOZZ	10988	D34666	WASHER,FLAT...........................	8
11	PAOZZ	96906	MS90725-195	SCREW,CAP,HEXAGON H..................	2
12	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON.....................	2
13	PAOZZ	96906	MS35338-46	WASHER,LOCK...........................	2
14	PAOZZ	10988	A59077	STUD,PLAIN............................	2
15	PAOZZ	96906	MS35338-46	WASHER,LOCK...........................	8
16	PAOZZ	96906	MS90726-64	SCREW,CAP,HEXAGON H..................	8

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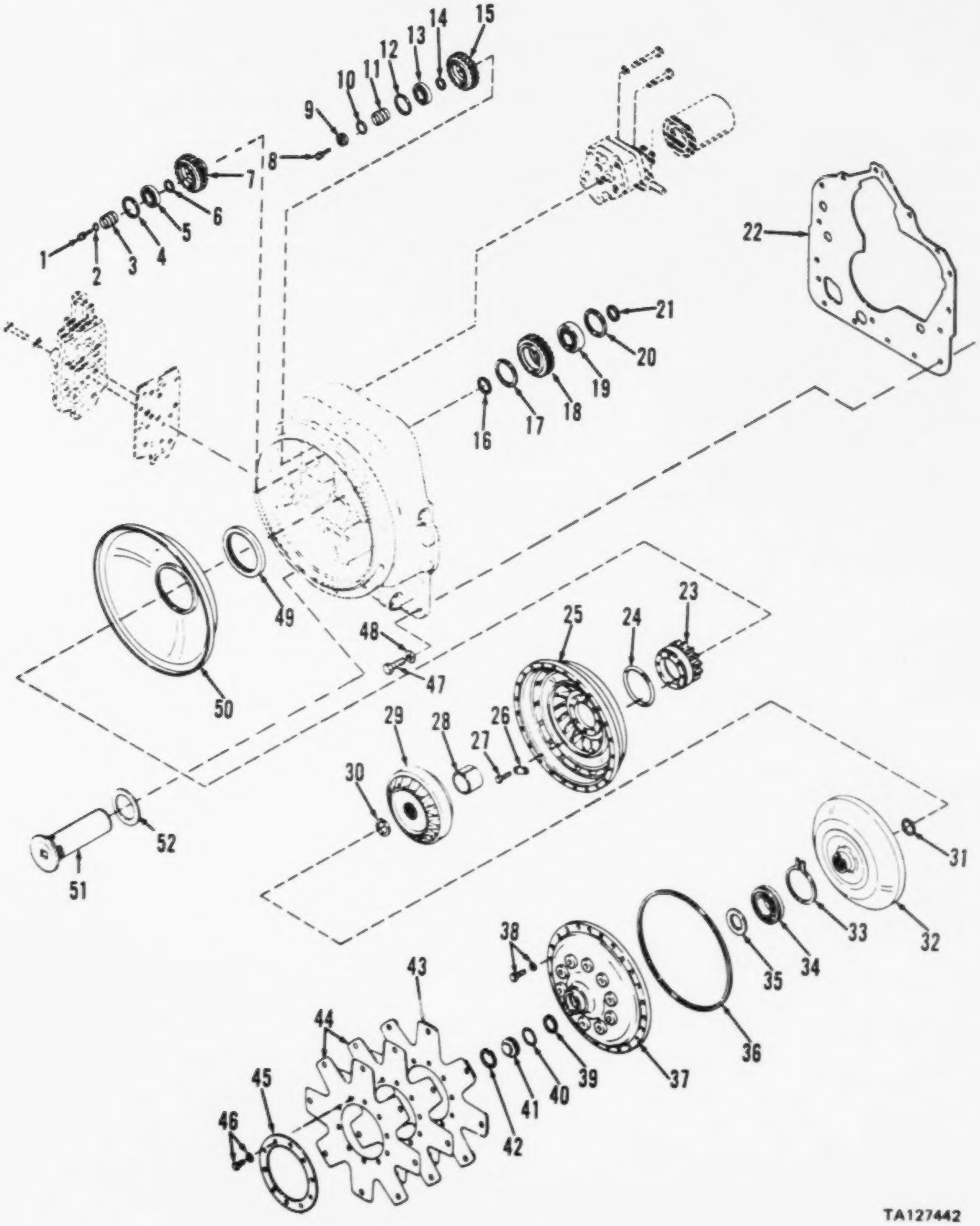
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Figure 46. Torque converter group.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0708 TORQUE CONVERTER OR FLUID COUPLING	
				FIG. 46 TORQUE CONVERTER GROUP	
1	PAHZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H..................	2
2	PAHZZ	96906	MS35338-46	WASHER,LOCK..........................	2
3	PAHZZ	12603	234327	SUPPORT,PUMP DRIVE AUXILIARY PUMP DRIVE BEARING......................	1
4	PAHZZ	12603	223878	RING,SPECIAL.........................	1
5	PAHZZ	12603	710047	BEARING,BALL,ANNULA..................	1
6	PAHZZ	12603	234908	RING,RETAINING BEARING LOCATING....	1
7	PAHZZ	12603	236585	GEAR,SPUR AUXILIARY PUMP DRIVE.....	1
8	PAHZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H..................	2
9	PAHZZ	96906	MS35338-46	WASHER,LOCK..........................	2
10	PAHZZ	12603	234908	RING,RETAINING BEARING LOCATING....	1
11	PAHZZ	12603	234327	SUPPORT,PUMP DRIVE PUMP DRIVE BEARING...............................	1
12	PAHZZ	12603	223922	RING,RETAINING.......................	1
13	PAHZZ	12603	743458	BEARING,PUMP DRIVE...................	1
14	PAHZZ	12603	234908	RING,RETAINING BEARING LOCATING....	1
15	PAHZZ	12603	236584	GEAR,PUMP DRIVE......................	1
16	PAHZZ	12603	234908	RING,RETAINING.......................	1
17	PAHZZ	12603	223878	RING,SPECIAL.........................	1
18	PAHZZ	12603	236583	GEAR,IDLER...........................	1
19	PAHZZ	12603	710047	BEARING,BALL,ANNULA..................	1
20	PAHZZ	12603	223878	RING,SPECIAL.........................	1
21	PAHZZ	12603	234908	RING,RETAINING.......................	1
22	KBHZZ	12603	235297	GASKET PART OF KIT P/N 801981.......	1
23	PAHZZ	12603	236582	GEAR,IMPELLER HUB IMPELLER HUB.....	1
24	KBHZZ	12603	234973	PACKING,PREFORMED PART OF KIT P/N 801979..............................	1
25	XBHZZ	12603	235214	IMPELLER.............................	1
26	PAHZZ	12603	234210	LOCKING PLATE,NUT A..................	1
27	PAHZZ	96906	MS90727-58	SCREW,CAP,HEXAGON H..................	8
28	XBHZZ	12603	234226	SPACER, BEARING......................	1
29	XBHZZ	12603	237936	REACTION MEMBER......................	1
30	PAHZZ	96906	MS16624-1168	RING,RETAINING.......................	1
31	PAHZZ	79136	5160-125	RING,RETAINING.......................	1
32	XBHZZ	12603	235216	TURBINE..............................	1
33	PAHZZ	12603	234216	RING,RETAINING.......................	1
34	PAHZZ	12603	234215	BEARING,BALL,ANNULA..................	1
35	PAHZZ	12603	235591	WASHER,LOCK BEARING RETAINER.......	1
36	KBHZZ	12603	234237	O-RING PART OF KIT P/N 801979.......	1
37	XBHZZ	12603	234207	COVER, IMPELLER......................	1
38	PAHZZ	40152	5C-516	SCREW ASSEMBLED WASHER.............	18
39	PAHZZ	79136	5160-125	RING,RETAINING.......................	1
40	KBHZZ	12603	60K-30114	O-RING PART OF KIT P/N 801979.......	1
41	PAHZZ	12603	223015	HEAD,HYDRAULIC MOTO..................	1
42	PAHZZ	96906	MS16625-1162	RING,RETAINING.......................	1
43	XBHZZ	12603	237142	DRIVE PLATE ASSY.....................	1
44	XBHZZ	12603	237141	DRIVE PLATE..........................	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
45	PAHZZ	12603	234286	SPACER,PLATE DRIVE PLATE BACKING...	1
46	PAHZZ	12603	5C612	SCREW,CAP,HEXAGON H ASSEMBLED WASHER..............................	10
47	PAHZZ	96906	MS90728-86	SCREW,CAP,HEXAGON H..................	16
48	PAHZZ	96906	MS35338-47	WASHER,LOCK..........................	16
49	KBHZZ	12603	235593	SEAL,PLAIN ENCASED PART OF KIT P/N 801979...............................	1
50	PAHZZ	12603	234362	DEFLECTOR,DIRT AND...................	1
51	PAHZZ	12603	231390	STRAINER ELEMENT,SE..................	1
52	PAOZZ	12603	219373	GASKET PART OF KIT P/N 801981.......	1

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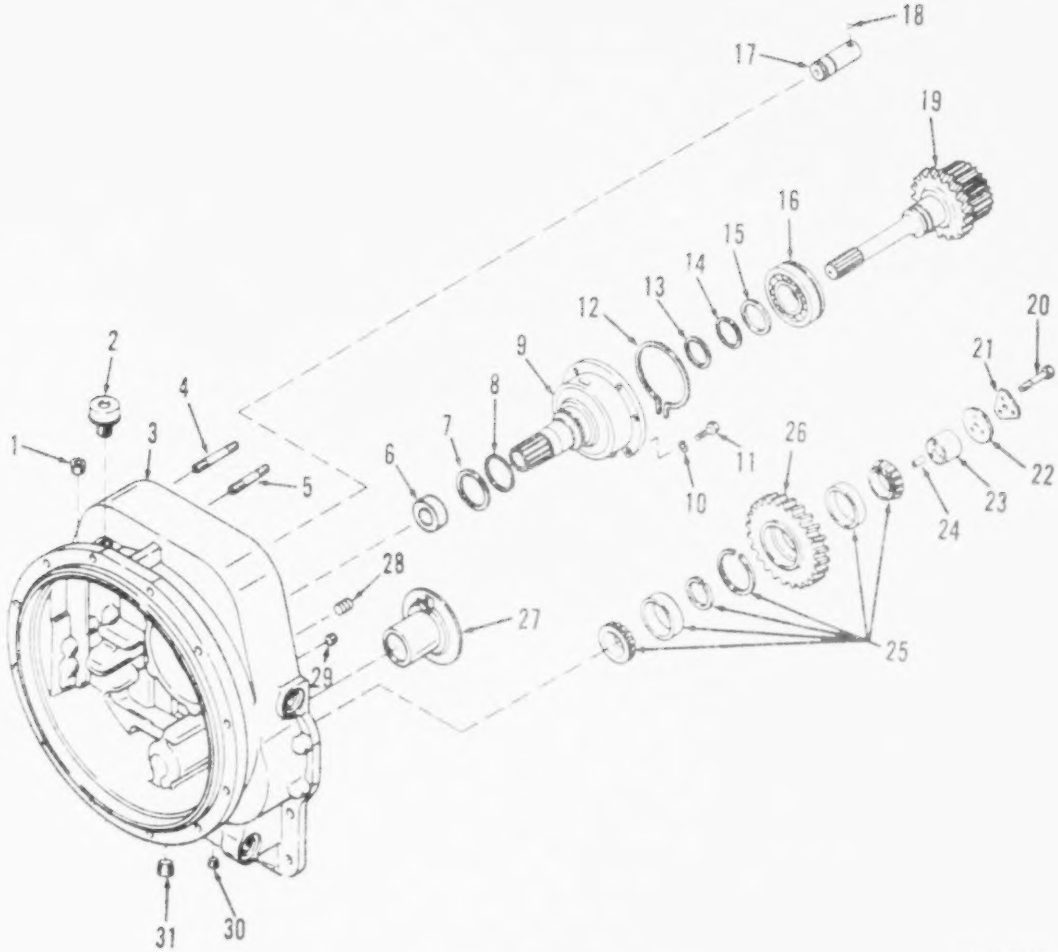
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Figure 47. Converter housing.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0708 TORQUE CONVERTER OR FLUID COUPLING	
				FIG. 47 CONVERTER HOUSING	
1	PAHZZ	96906	MS49005-4	PLUG,PIPE HEAD	1
2	PAOZZ	12603	211433	BREATHER	1
3	XBHZZ	12603	237437	HOUSING, CONVERTER	1
4	PAHZZ	12603	238900	STUD,PLAIN PUMP MOUNTING	1
5	PAHZZ	12603	234932	STUD,PLAIN PUMP MOUNTING	1
6	PAHZZ	12603	231624	BEARING,ROLLER,CYLI	1
7	KBHZZ	12603	237377	SEAL RING,METAL PART OF KIT P/N 801979	1
8	KBHZZ	12603	237378	SPRING,EXPANDER,PIS PART OF KIT P/N 801979	1
9	PAHZZ	12603	235296	SHAFT,SHOULDERED	1
10	PAHZZ	96906	MS35338-46	WASHER LOCK	1
11	PAHZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H	6
12	PAHZZ	12603	234229	RING,RETAINING	1
13	PAHZZ	12603	223085	RING,PISTON PART OF KIT P/N 801979	1
14	PAHZZ	12603	231776	RING,RETAINING	1
15	PAHZZ	12603	234230	SPACER,RING	1
16	PAHZZ	12603	234228	BEARING	1
17	PAHZZ	12603	234248	IDLER SHAFT,STRAIGH	1
18	PAHZZ	96906	MS19061-7	BALL,BEARING STUB SHAFT	1
19	PAHZZ	12603	236140	GEAR AND HUB ASSY TURBINE SHAFT AND DISC	1
20	PAHZZ	96906	MS90725-94	SCREW,CAP,HEXAGON H	3
21	PAHZZ	12603	234918	LOCKING PLATE,NUT A	1
22	XBHZZ	12603	234299	PLATE	1
23	PAHZZ	12603	234257	PIN,STRAIGHT HEADLE IDLER	1
24	PAHZZ	12603	234309	PIN,HOLLOW	1
25	PAHZZ	12603	234264	BEARING,ROLLER,TAPE	1
26	PAHZZ	12603	234256	GEAR,REVERSE IDLER	1
27	PAHZZ	12603	234265	BUSHING,SLEEVE CONVERTER HOUSING	1
28	PAHZZ	12603	11F8	PLUG,PIPE	1
29	PAHZZ	19207	444687	PLUG,PIPE	1
30	PAHZZ	19207	444687	PLUG,PIPE	1
31	PAHZZ	12603	11F8	PLUG,PIPE	1

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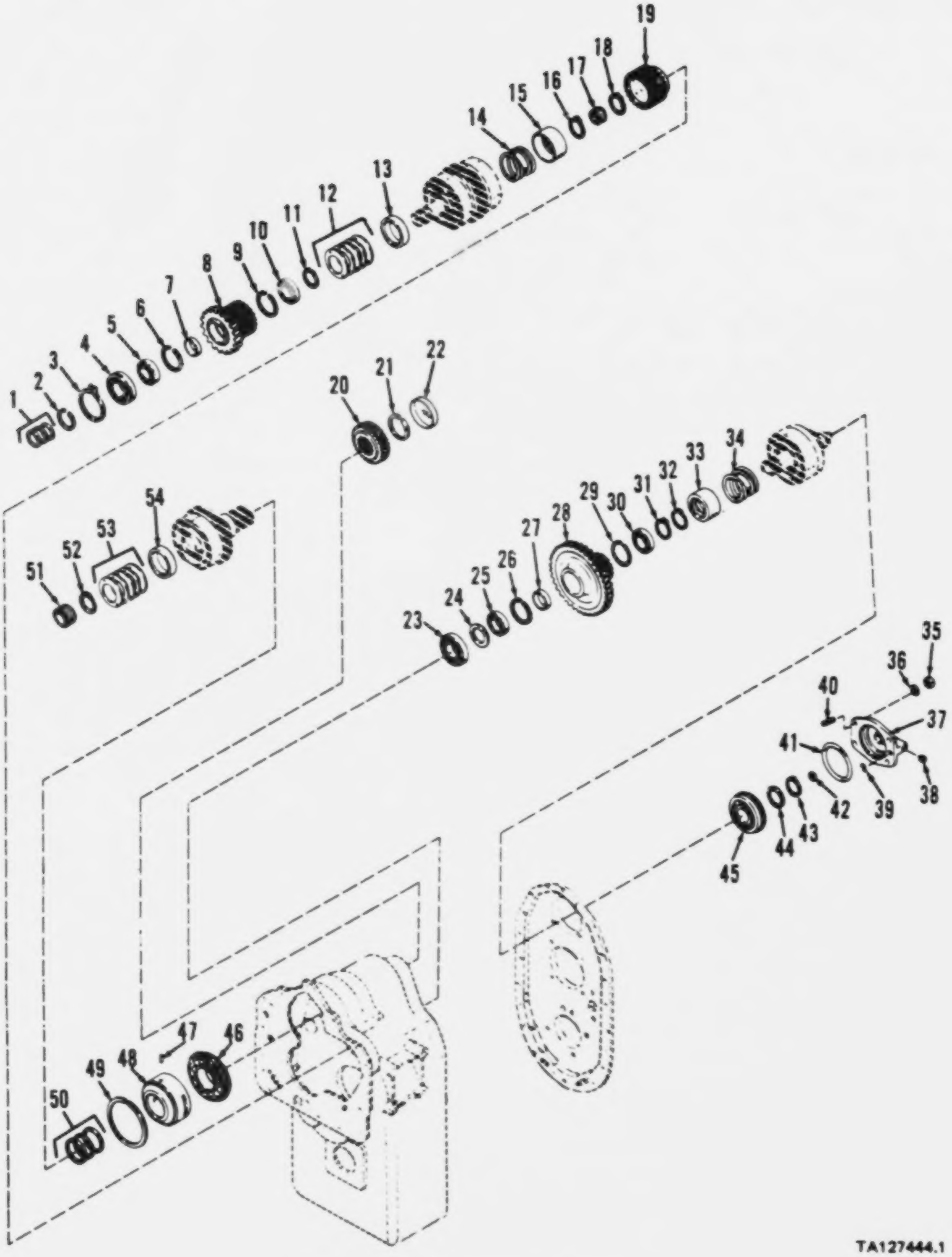
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Figure 48. Transmission assembly (Sheet 1 of 2).

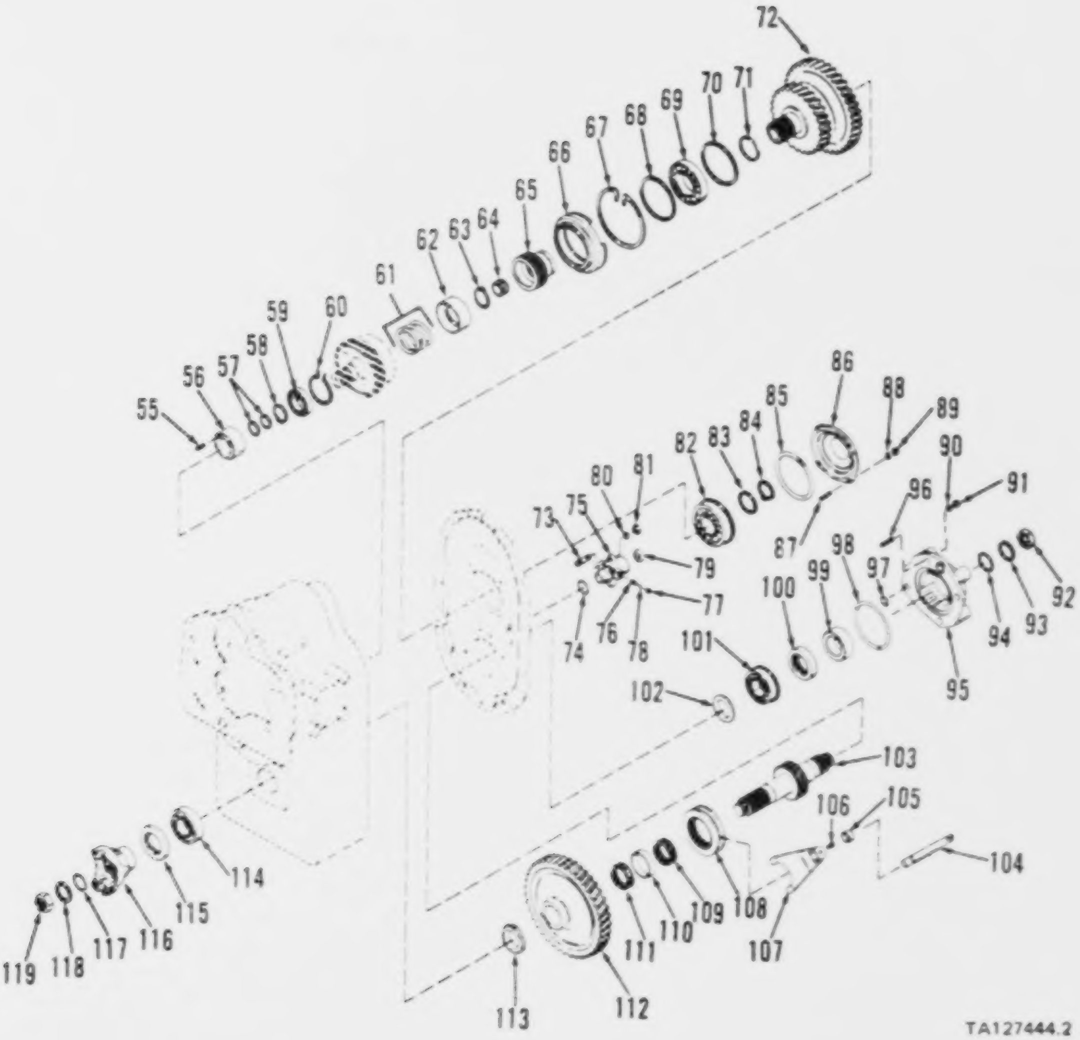
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Figure 48. Transmission assembly (Sheet 2 of 2).

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0710 TRANSMISSION ASSEMBLY	
				FIG. 48 TRANSMISSION ASSEMBLY	
1	PAHZZ	12603	215183	RING,PISTON PART OF KIT P/N 801981..	3
2	PAHZZ	12603	224083	RING,RETAINING........................	1
3	PAHZZ	12603	230889	RING,SPECIAL..........................	1
4	PAHZZ	12603	223349	BEARING,BALL,ANNULA REVERSE AND SECOND SHAFT..........................	1
5	PAHZZ	12603	233389	BEARING,BALL,ANNULA CLUTCH..........	1
6	PAHZZ	12603	234141	RING,RETAINING........................	1
7	PAHZZ	12603	234304	SPACER,RING...........................	1
8	PAHZZ	12603	236151	REVERSE GEAR AND HU REVERSE CLUTCH.	1
9	PAHZZ	12603	234141	RING,RETAINING........................	1
10	PAHZZ	12603	230829	BEARING,BALL,ANNULA CLUTCH DRIVEN..	1
11	PAHZZ	12603	237669	RING,RETAINING........................	1
12	PAHZZ	12603	237443	WASHER,CONCAVE RETURN...............	5
13	PAHZZ	12603	237442	SPACER,RING PISTON RETURN SPRING...	1
14	PAHZZ	12603	235960	SPRING,HELICAL,COMP PISTON RETURN..	1
15	PAHZZ	12603	235959	RETAINER,HELICAL CO...................	1
16	PAHZZ	12603	234350	RING,RETAINING........................	1
17	PAHZZ	12603	233065	PIN,STRAIGHT HEADLE REVERSE AND SECOND SHAFT..........................	1
18	PAHZZ	12603	234347	RING,RETAINING........................	1
19	PAHZZ	12603	236165	GEAR AND HUB ASSY DISC..............	1
20	PAHZZ	12603	234954	GEAR,HELICAL FORWARD SHAFT..........	1
21	PAHZZ	12603	224020	RING RETAINING........................	1
22	PAHZZ	12603	234999	WASHER,RECESSED.......................	1
23	PAHZZ	12603	225605	BEARING,BALL,ANNULA FRONT LOW SPEED CLUTCH SHAFT.........................	1
24	PAHZZ	12603	234145	SPACER,RING FRONT BEARING...........	1
25	PAHZZ	12603	230885	BEARING,BALL,ANNULA LOW SPEED......	1
26	PAHZZ	12603	223964	RING,RETAINING LOW SPEED GEAR BEARING................................	1
27	PAHZZ	12603	234305	SPACER,RING LOW SPEED GEAR..........	1
28	PAHZZ	12603	236681	GEAR,HELICAL LOW SHAFT..............	1
29	PAHZZ	12603	223964	RING,RETAINING LOW SPEED GEAR BEARING................................	1
30	PAHZZ	12603	230885	BEARING,BALL,ANNULA LOW SPEED GEAR.	1
31	PAHZZ	12603	234347	RING,RETAINING........................	1
32	PAHZZ	12603	234350	RING,RETAINING........................	1
33	PAHZZ	12603	235959	RETAINER,HELICAL CO...................	1
34	PAHZZ	12603	235960	SPRING,HELICAL,COMP PISTON RETURN..	1
35	PAHZZ	96906	MS51968-11	NUT,PLAIN,HEXAGON.....................	4
36	PAHZZ	96906	MS35338-47	WASHER,LOCK...........................	4
37	PAHZZ	12603	236607	CAP AND PLUG ASSEMB LOW SHAFT......	1
38	PAHZZ	10988	218-5152	PLUG,MACHINE THREAD..................	1
39	KBHZZ	12603	25K-30012	PACKING,PREFORMED PART OF KIT P/N 801981................................	1
40	PAHZZ	12603	226862	STUD,PLAIN............................	4
41	KBHZZ	96279	297060R1	PACKING,PREFORMED PART OF KIT P/N 801981................................	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
42	KBHZZ	12603	234130	SPACER,RING PART OF KIT P/N 801981..	1
43	PAHZZ	12603	234347	RING,RETAINING.............	1
44	PAFZZ	12603	234230	SPACER,RING.........................	1
45	PAHZZ	12603	225597	BEARING,BALL,ANNULA LOW SPEED SHAFT	1
46	PAHZZ	24617	954295	BEARING,BALL,ANNULA FORWARD SHAFT..	1
47	PAHZZ	89749	672572	LOCK CLUTCH OIL SEA................	1
48	XBHZZ	12603	235749	SLEEVE, PISTON RING................	1
49	PAHZZ	12603	235764	RING,RETAINING......................	1
50	KBHZZ	12603	222104	RING,PISTON PART OF KIT P/N 801981..	3
51	PAHZZ	12603	235763	BEARING UNIT,PLAIN PILOT, FORWARD SHAFT...............................	1
52	PAHZZ	12603	237669	RING,RETAINING......................	1
53	PAHZZ	12603	237443	WASHER,SPRING TENSI RETURN..........	5
54	PAHZZ	12603	237442	SPACER,RING PISTON RETURN SPRING...	1
55	PAHZZ	12603	664131	ROLL PIN,BRAKE OUTER RACE..........	1
56	PAHZZ	12603	236612	RING,PISTON,TRANSMI OUTER..........	1
57	PAHZZ	12603	215183	RING,PISTON PART OF KIT P/N 801981..	2
58	PAHZZ	96906	MS16624-1196	RING,RETAINING......................	1
59	PAHZZ	12603	230885	BEARING,BALL,ANNULA 3RD CLUTCH SHAFT...............................	1
60	PAHZZ	12603	236614	RING,RETAINING 3RD CLUTCH FRONT BEARING.............................	1
61	PAHZZ	12603	235960	SPRING,HELICAL,COMP PISTON RETURN..	1
62	PAHZZ	12603	235959	RETAINER,HELICAL CO................	1
63	PAHZZ	12603	234350	RING,RETAINING......................	1
64	PAHZZ	12603	233065	PIN,STRAIGHT HEADLE 3RD CLUTCH SHAFT...............................	1
65	PAHZZ	12603	236613	DISK,CLUTCH 3RD CLUTCH.............	1
66	PAHHH	12603	236622	HOUSING,BEARING UNI................	1
67	PAHZZ	12603	236625	RING,RETAINING BEARING CARRIER.....	1
68	PAHZZ	12603	223997	RING,RETAINING BEARING.............	1
69	PAHZZ	12603	225843	BEARING,BALL,ANNULA 3RD CLUTCH DISC HUB................................	1
70	PAHZZ	12603	223997	RING,RETAINING BEARING.............	1
71	PAHZZ	12603	230067	RING,RETAINING......................	1
72	PAHZZ	12603	236992	GEARSHAFT,HELICAL-S SHAFT..........	1
73	PAHZZ	12603	207758	STUD,PLAIN..........................	2
74	KBHZZ	96906	MS28775-220	PACKING,PREFORMED PART OF KIT P/N 801981..............................	1
75	XBHZZ	12603	231877	SUPPORT HIGH AND LOW SHIFT RAIL....	1
76	PAHZZ	12603	201413	SPRING,HELICAL,COMP................	1
77	PAHZZ	96906	MS49005-4	PLUG,PIPE HOUSING DETENT...........	1
78	PAHZZ	96906	MS19059-2418	BALL,BEARING........................	1
79	PAHZZ	12603	239218	SEAL,PLAIN ENCASED PART OF KIT P/N 801981..............................	1
80	PAHZZ	96906	MS35338-46	WASHER,LOCK.........................	2
81	PAHZZ	96906	MS51968-8	NUT,PLAIN,HEXAGON..................	2
82	PAHZZ	23040	B8QH7065B	BEARING,BALL,ANNULA................	1
83	PAHZZ	12603	234904	SPACER,RING REAR BEARING SUPPORT...	1
84	PAHZZ	96906	MS16624-1215	RING,RETAINING......................	1
85	KBHZZ	12603	25K-40508	O-RING PART OF KIT P/N 801981.......	1
86	XBHZZ	12603	234902	BEARING, CAP, REAR IDLER SHAFT.....	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
87	PAHZZ	12603	226862	STUD,PLAIN REAR BEARING CAP	4
88	PAHZZ	96906	MS35338-47	WASHER,LOCK	4
89	PAHZZ	96906	MS51968-11	NUT,PLAIN,HEXAGON	4
90	PAHZZ	96906	MS35338-49	WASHER,LOCK	4
91	PAHZZ	96906	MS51968-17	NUT,PLAIN,HEXAGON	4
92	PAHZZ	12603	222960	NUT,SELF-LOCKING,SI	1
93	PAHZZ	12603	222179	WASHER,FLAT	1
94	KBHZZ	12603	25K-60116	PACKING,PREFORMED PART OF KIT P/N 801981	1
95	XBHZZ	12603	236283	CAP, BEARING	1
96	PAHZZ	12603	234906	STUD,PLAIN	4
97	KBHZZ	12603	25K-30022	O-RING PART OF KIT P/N 801981	1
98	KBHZZ	12603	25K-40328	PACKING,PREFORMED PART OF KIT P/N 801981	1
99	XBHZZ	12603	237113	SPACER BEARING TO FLANGE	1
100	KBHZZ	12603	236629	OIL SEAL PART OF KIT P/N 801981	1
101	PAHZZ	12603	237271	BEARING,BALL,ANNULA OUTPUT SHAFT	1
102	PAHZZ	12603	237118	BEARING,WASHER,THRU	1
103	PAHZZ	12603	237111	SHAFT ASSEMBLY	1
104	PAHZZ	12603	237115	PIN,SHOULDER,HEADLE HIGH AND LOW SHIFT	1
105	XBHZZ	12603	226870	SPACER, SHIFT RAIL	1
106	PAHZZ	12603	201566	SETSCREW	1
107	XBHZZ	12603	237114	FORK HIGH AND LOW SHIFT	1
108	XBHZZ	12603	237112	HUB, RANGE SHIFT	1
109	PAHZZ	12603	237117	BEARING UNIT,ROLLER	1
110	XBHZZ	12603	237116	SPACER, BEARING	1
111	PAHZZ	12603	237117	BEARING UNIT,ROLLER	1
112	PAHZZ	12603	237104	GEAR,SPUR	1
113	PAHZZ	12603	237118	BEARING,WASHER,THRU	1
114	PAHZZ	12603	225605	BEARING,BALL,ANNULA OUTPUT SHAFT	1
115	PAHZZ	12603	230954	SEAL,PLAIN ENCASED PART OF KIT P/N 801981	1
116	PAHZZ	12603	231136	FLANGE,COMPANION,UN	1
117	KBHZZ	12603	25K-60116	PACKING,PREFORMED PART OF KIT P/N 801981	1
118	PAHZZ	12603	222179	WASHER,FLAT	1
119	PAHZZ	12603	222960	NUT,SELF-LOCKING,SI	1

END OF FIGURE

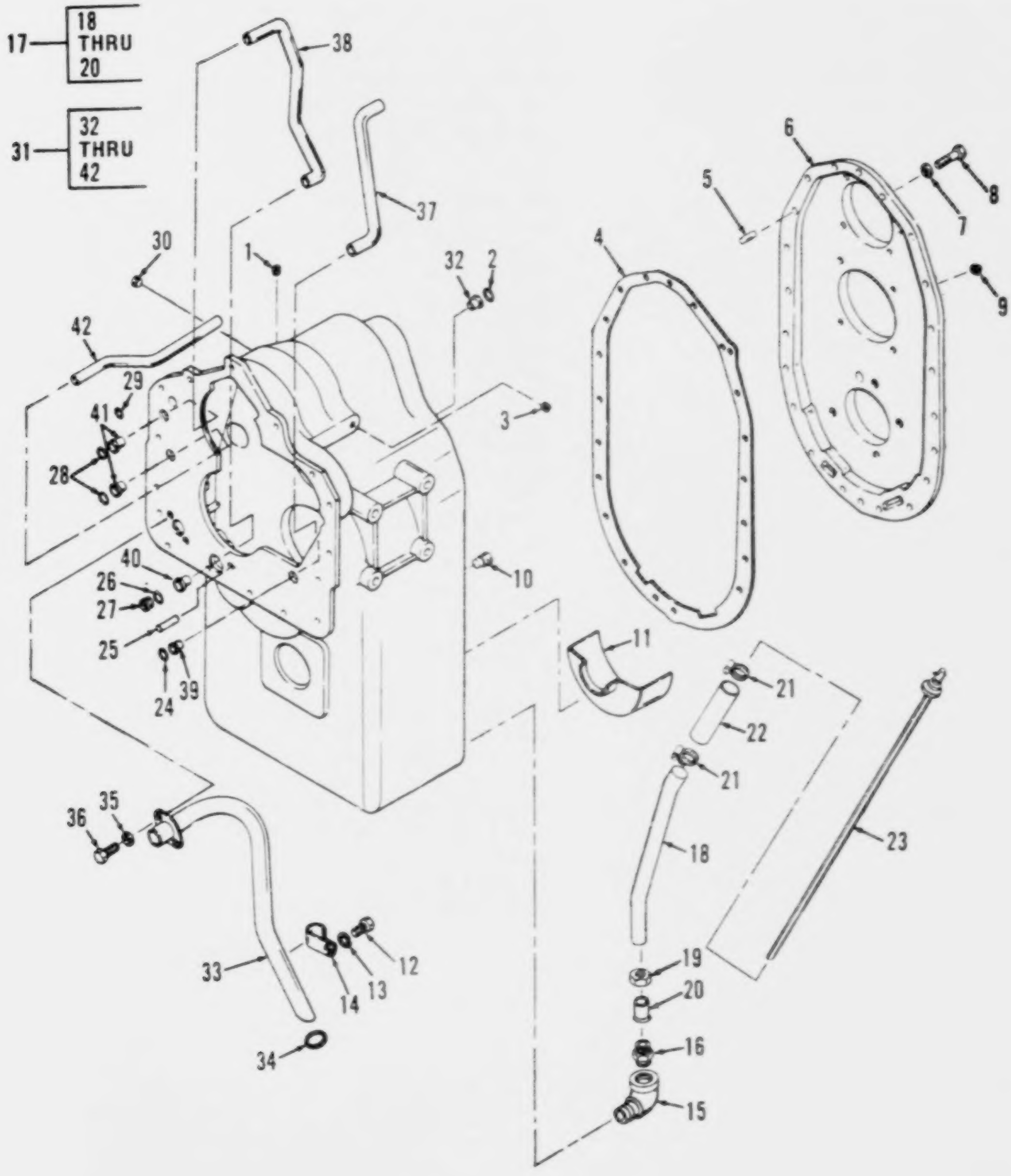
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Figure 49. Transmission case.

GROUP 0710 TRANSMISSION ASSEMBLY

FIG. 49 TRANSMISSION CASE

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAHZZ	03958	MS49005-10	PLUG,PIPE	1
2	KBHZZ	12603	25K-40026	PACKING,PREFORMED PART OF KIT P/N 801981	1
3	PAHZZ	96906	MS49005-4	PLUG,PIPE	1
4	KBHZZ	12603	236646	GASKET PART OF KIT P/N 801981	1
5	PAHZZ	12603	214295	PIN REAR COVER TO TRANSMISSION CASE	2
6	XBHHD	12603	237381	COVER,REAR	1
7	PAHZZ	96906	MS35338-47	WASHER,LOCK	20
8	PAHZZ	96906	MS90725-89	SCREW,CAP,HEXAGON H	20
9	PAHZZ	19207	444687	PLUG,PIPE	1
10	PAOZZ	03958	MS49005-10	PLUG,PIPE	1
11	XBHZZ	12603	237573	OIL BAFFLE	1
12	PAHZZ	96906	MS90728-83	SCREW,CAP,HEXAGON H	1
13	PAHZZ	96906	MS35338-47	WASHER,LOCK	1
14	PAHZZ	12603	6H-24	CLAMP,LOOP	1
15	PAOZZ	10988	221-566	ELBOW,PIPE	2
16	PAOZZ	81343	20-20 070102CA	ADAPTER,STRAIGHT,PI	2
17	PAOZZ	10988	L-104128	TUBE ASSEMBLY,METAL	1
18	XAOZZ	10988	L104127	.TUBE, DIPSTICK	1
19	XAOZZ	10988	218-349	.NUT,TUBE COUPLING	1
20	XAOZZ	10988	218-369	.SLEEVE, TUBE	1
21	PAOZZ	96906	MS35842-12	CLAMP,HOSE	2
22	PAOZZ	10988	L47464	HOSE,NONMETALLIC	1
23	PAOZZ	10988	L104126	GAGE ROD-CAP,LIQUID	2
24	KBHZZ	12603	25K-40026	PACKING,PREFORMED PART OF KIT P/N 801981	1
25	PAHZZ	12603	214295	PIN	1
26	KBHZZ	12603	25K-40104	PACKING,PREFORMED PART OF KIT P/N 801981	1
27	XDHZZ	12603	236637	SLEEVE,CLINCH,TUBE THIRD SPEED	1
28	KBHZZ	12603	25K-40026	PACKING,PREFORMED PART OF KIT P/N 801981	2
29	KBHZZ	12603	25K-30018	PACKING,PREFORMED PART OF KIT P/N 801981	1
30	PAHZZ	96906	MS49005-4	PLUG,PIPE	1
31	XBHZZ	12603	237890	TRANSMISSION CASE ASSY	1
32	PAHZZ	12603	222067	.SLEEVE	1
33	XBHZZ	12603	236623	.SUCTION TUBE ASSY	1
34	KBHZZ	12603	25K-40104	.PACKING,PREFORMED PART OF KIT P/N 801981	1
35	PAHZZ	96906	MS35338-45	.WASHER,LOCK	2
36	PAHZZ	96906	MS90725-31	.BOLT,MACHINE	2
37	XBHZZ	12603	237860	.TUBE, LUBRICATION CLUTCH	1
38	XBHZZ	12603	236624	.TUBE, THIRD SPEED	1
39	PAHZZ	12603	221871	.TUBE,LUBRICATING	1
40	PAHZZ	12603	222067	.SLEEVE	1
41	PAHZZ	12603	222067	.SLEEVE	2
42	PAHZZ	12603	234157	.TUBE,PRESSURE SPEED CLUTCH	1

END OF FIGURE

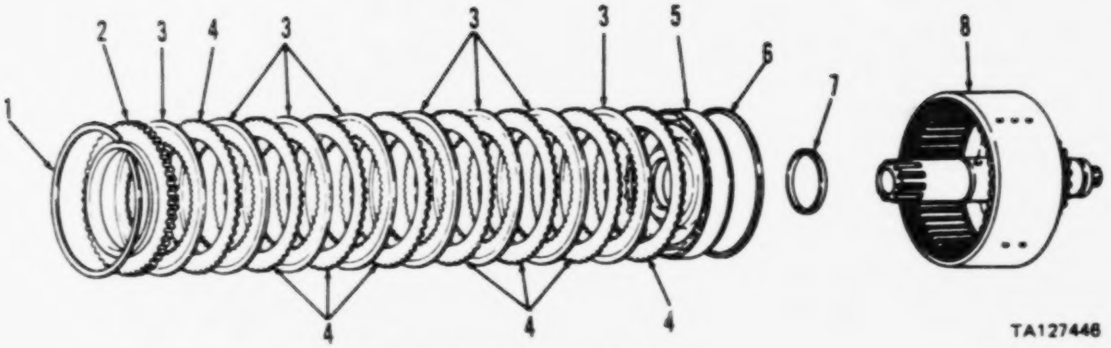
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Figure 50. Low clutch assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0713 INTERMEDIATE CLUTCH	
				FIG. 50 LOW CLUTCH ASSEMBLY	
1	PAHZZ	12603	234111	RING,RETAINING......................	1
2	PAHZZ	12603	236847	DISK,CLUTCH CLUTCH DISC BACKING....	1
3	PAHZZ	12603	234336	DISK,CLUTCH........................	8
4	PAHZZ	12603	234109	DISK,CLUTCH........................	8
5	PAHZZ	12603	236150	PISTON,CLUTCH,TRANS................	1
6	KBHZZ	12603	237032	PACKING,PREFORMED PART OF KIT P/N 801981............................	1
7	KBHZZ	12603	234113	PACKING,PREFORMED PART OF KIT P/N 801981............................	1
8	XBHZZ	12603	236656	VALVE LOW CLUTCH SHAFT DRUM AND BLEED..............................	1

END OF FIGURE

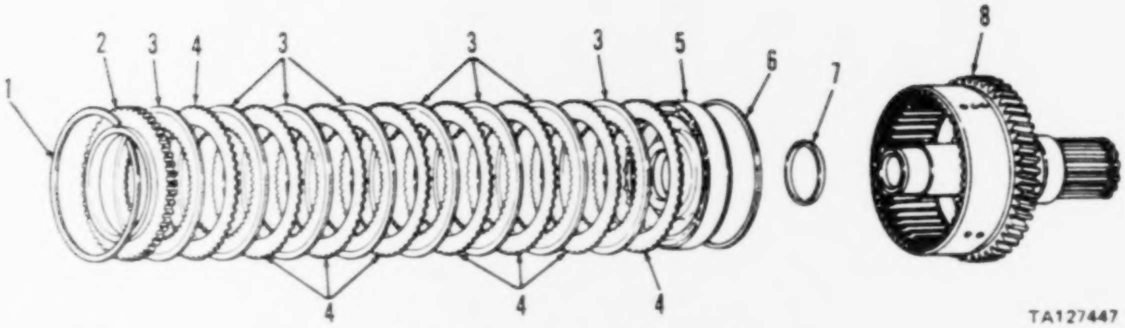
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Figure 51. Forward clutch assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0713 INTERMEDIATE CLUTCH	
				FIG. 51 FORWARD CLUTCH ASSEMBLY	
1	PAHZZ	12603	234111	.RING,RETAINING......................	1
2	PAHZZ	12603	236847	.DISK,CLUTCH CLUTCH DISC BACKING...	1
3	PAHZZ	12603	237016	.DISK,CLUTCH.........................	8
4	PAHZZ	12603	234109	.DISK,CLUTCH.........................	8
5	XBHZZ	12603	237450	.PISTON, CLUTCH......................	1
6	KBHZZ	12603	237032	.PACKING,PREFORMED PART OF KIT P/N 801981............................	1
7	KBHZZ	12603	234113	.PACKING,PREFORMED PART OF KIT P/N 801981............................	1
8	PAHZZ	12603	237507	.DRUM,FORWARD CLUTCH FORWARD SHAFT.	1

END OF FIGURE

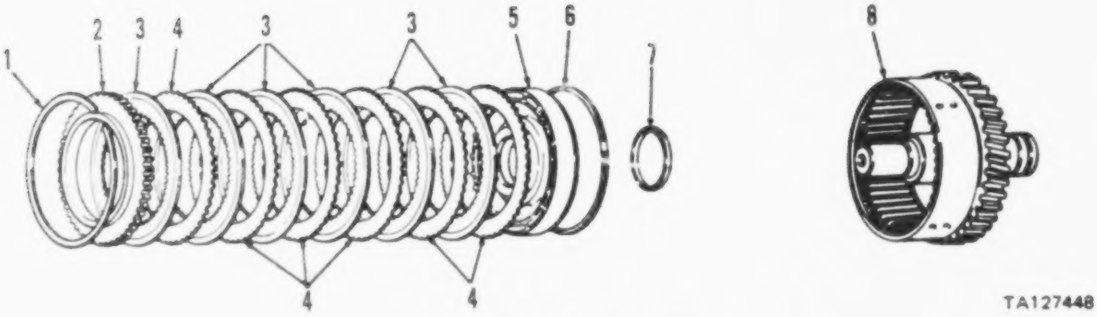
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Figure 52. Third clutch assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0713 INTERMEDIATE CLUTCH	
				FIG. 52 THIRD CLUTCH ASSEMBLY	
1	PAHZZ	12603	234111	.RING,RETAINING......................	1
2	PAHZZ	12603	236847	.DISK,CLUTCH CLUTCH DISC BACKING...	1
3	PAHZZ	12603	237016	.DISK,CLUTCH.........................	6
4	PAHZZ	12603	234109	.DISK,CLUTCH.........................	6
5	PAHZZ	12603	236178	.CLUTCH PISTON AND V.................	1
6	KBHZZ	12603	237032	PACKING,PREFORMED PART OF KIT P/N 801981.............................	1
7	KBHZZ	12603	234113	PACKING,PREFORMED PART OF KIT P/N 801981.............................	1
8	PAHZZ	12603	236611	DRUM,THIRD CLUTCH 3RD CLUTCH SHAFT.	1

END OF FIGURE

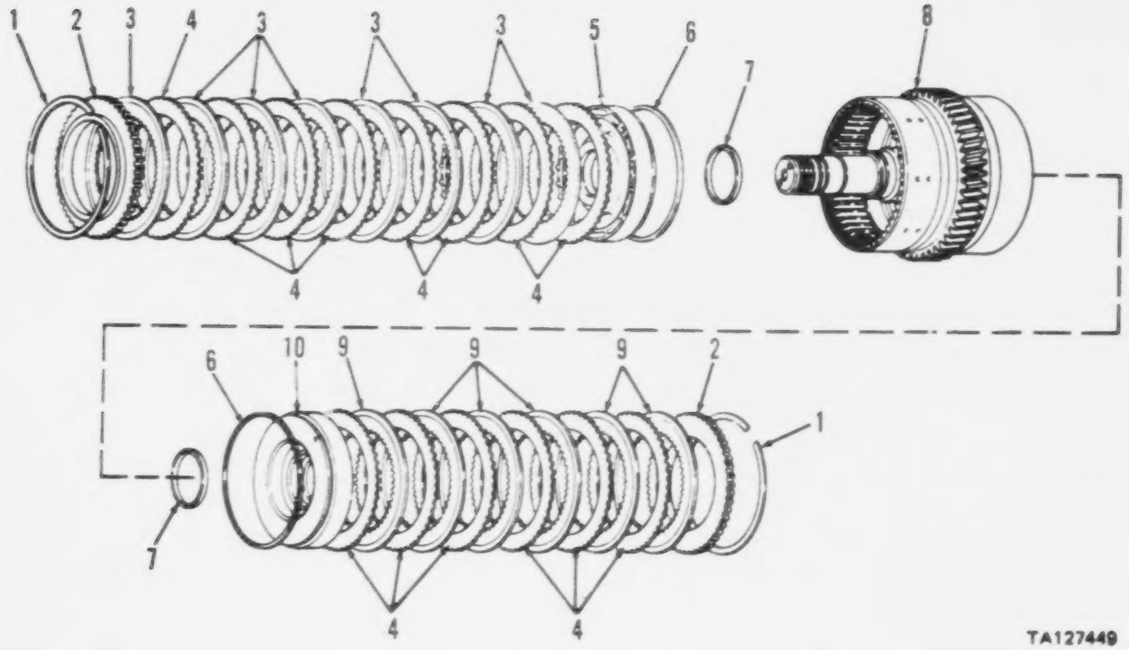
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Figure 53. Reverse and second clutch assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0713 INTERMEDIATE CLUTCH	
				FIG. 53 REVERSE AND SECOND CLUTCH ASSEMBLY	
1	PAHZZ	12603	234111	RING,RETAINING........................	2
2	PAHZZ	12603	236847	DISK,CLUTCH CLUTCH DISC BACKING....	2
3	PAHZZ	12603	237016	DISK,CLUTCH.........................	8
4	PAHZZ	12603	234109	DISK,CLUTCH.........................	14
5	XBHZZ	12603	237450	PISTON, CLUTCH......................	1
6	KBHZZ	12603	237032	PACKING,PREFORMED PART OF KIT P/N 801981................................	2
7	KBHZZ	12603	234113	PACKING,PREFORMED PART OF KIT P/N 801981................................	2
8	PAHZZ	12603	237453	DRUM,CLUTCH REVERSE AND SECOND SHAFT.................................	1
9	PAHZZ	12603	237016	DISK,CLUTCH.........................	6
10	PAHZZ	12603	236178	CLUTCH PISTON AND V.................	1

END OF FIGURE

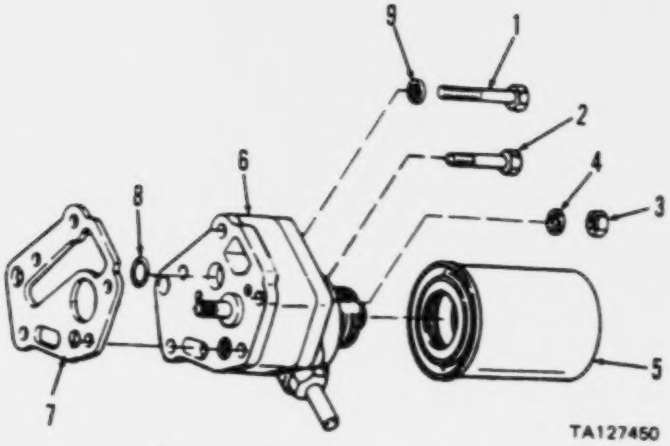
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Figure 54. Charging pump and filter.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0721 COOLERS,PUMPS,MOTORS	
				FIG. 54 CHARGING PUMP AND MOTOR	
1	PAFZZ	96906	MS90728-101	SCREW,CAP,HEXAGON H..................	1
2	PAFZZ	96906	MS90725-99	SCREW,CAP,HEXAGON H..................	2
3	PAFZZ	96906	MS51968-11	NUT,PLAIN,HEXAGON....................	2
4	PAFZZ	96906	MS35338-47	WASHER,LOCK..........................	2
5	PAOZZ	12603	234099	FILTER ELEMENT,FLUI..................	1
6	PAFZZ	12603	237454	PUMP,CHARGING........................	1
7	PAFZZ	12603	235283	GASKET PART OF KIT P/N 801979.......	1
8	PAFZZ	12603	60K-30018	PACKING,PREFORMED PART OF KIT P/N 801979................................	1
9	PAFZZ	96906	MS35338-47	WASHER,LOCK..........................	3

END OF FIGURE

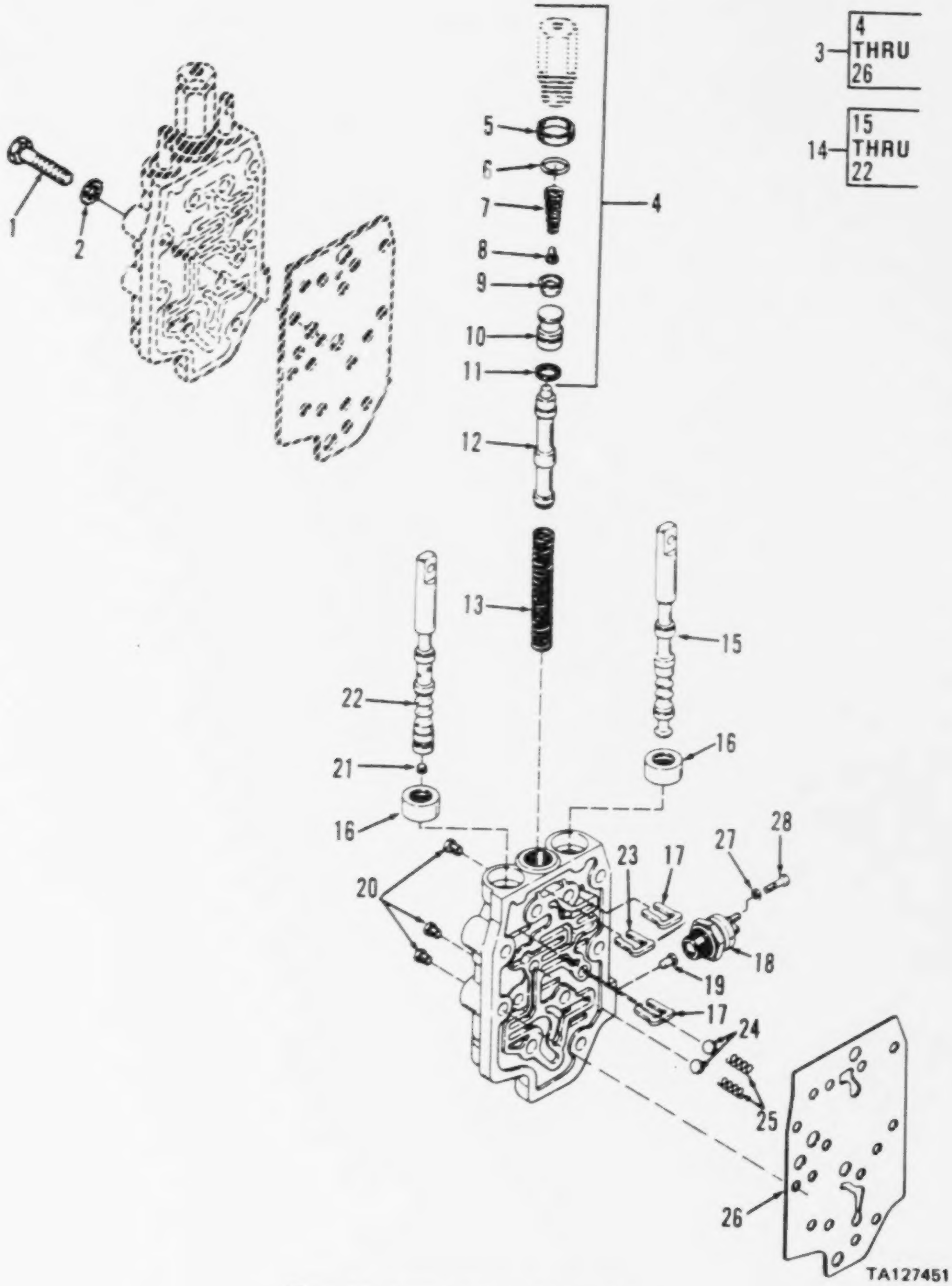
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Figure 55. Control valve and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0721 COOLERS, PUMPS,MOTORS	
				FIG. 55 CONTROL VALVE AND MOUNTING	
1	PAFZZ	96906	MS90725-73	SCREW,CAP,HEXAGON H..................	9
2	PAFZZ	96906	MS35338-46	WASHER,LOCK..........................	9
3	PAFHD	12603	234427	VALVE ASSEMBLY,TRAN..................	1
4	PAHHD	12603	235327	.PARTS KIT,VALUE BOD.................	1
5	KBHZZ	12603	228931	..SEAL,OIL PART OF KIT P/N 801981...	1
6	KBHZZ	12603	25K-30022	..O-RING PART OF KIT P/N 801981.....	1
7	XBHZZ	12603	227880	..SPRING,SPECIAL PISTON BALANCE....	1
8	XBHZZ	12603	233264	..PIN, SPRING RETAINER.............	1
9	KBHZZ	12603	227881	..CUP,HYDRAULIC BRAKE PART OF KIT P/N 801981..........................	1
10	XBHZZ	12603	235315	..PISTON, INCHING..................	1
11	PAHZZ	89881	60K-40104	..PACKING,PREFORMED................	1
12	XBHZZ	12603	234185	.SPOOL, VALVE.......................	1
13	PAHZZ	12603	234181	.SPRING,HELICAL,COMP CONTROL VALVE.	1
14	XBHDD	12603	236737	.HOUSING, CONTROL VALVE............	1
15	PAHZZ	12603	234169	..SLIDE,DIRECTIONAL C FORWARD AND REVERSE.............................	1
16	KBHZZ	12603	234650	..SEAL,PLAIN ENCASED PART OF KIT P/N 801981............................	1
17	XBHZZ	12603	234170	..STOP, VALVE SPOOL................	2
18	PAOZZ	10988	D87213	..SWITCH,PUSH......................	1
19	PAHZZ	12603	233779	..PIN,GROOVED,HEADED ACTUATING, NEUTRAL SWITCH......................	1
20	PAHZZ	12603	40K-02	..PLUG,PIPE........................	3
21	XAHZZ	12603	16F-01	..PLUG,PIPE........................	1
22	PAHZZ	12603	221871	..TUBE,LUBRICATING SELECTOR........	1
23	XBHZZ	12603	234170	.STOP, VALVE SPOOL..................	1
24	PAHZZ	96906	MS19059-2424	.BALL,BEARING.......................	2
25	PAHZZ	12603	235473	.SPRING,HELICAL,COMP................	2
26	PAFZZ	12603	234166	.GASKET PART OF KIT P/N 801981......	1
27	PAOZZ	96906	MS35338-42	WASHER,LOCK.........................	2
28	PAOZZ	96906	MS51957-41	SCREW,MACHINE.......................	2

END OF FIGURE

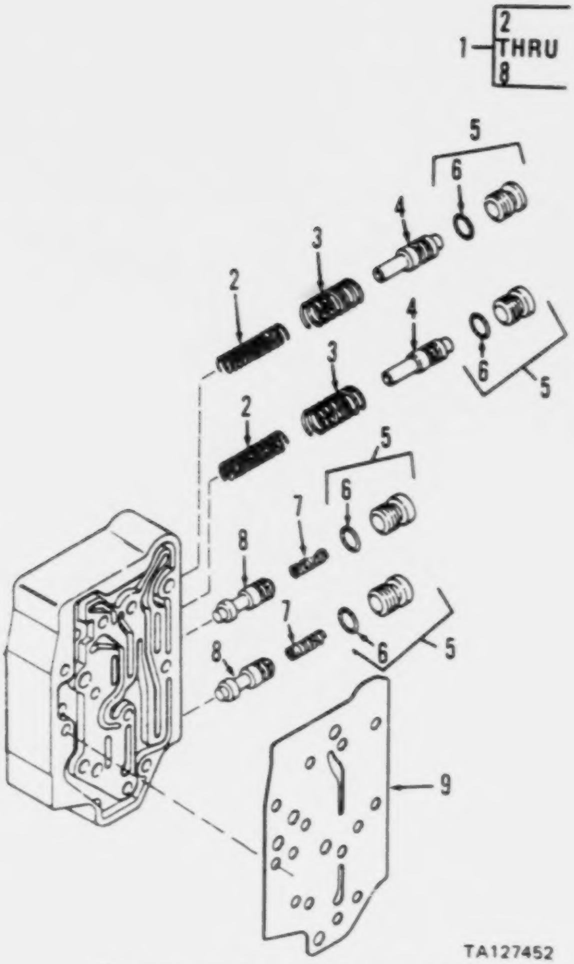
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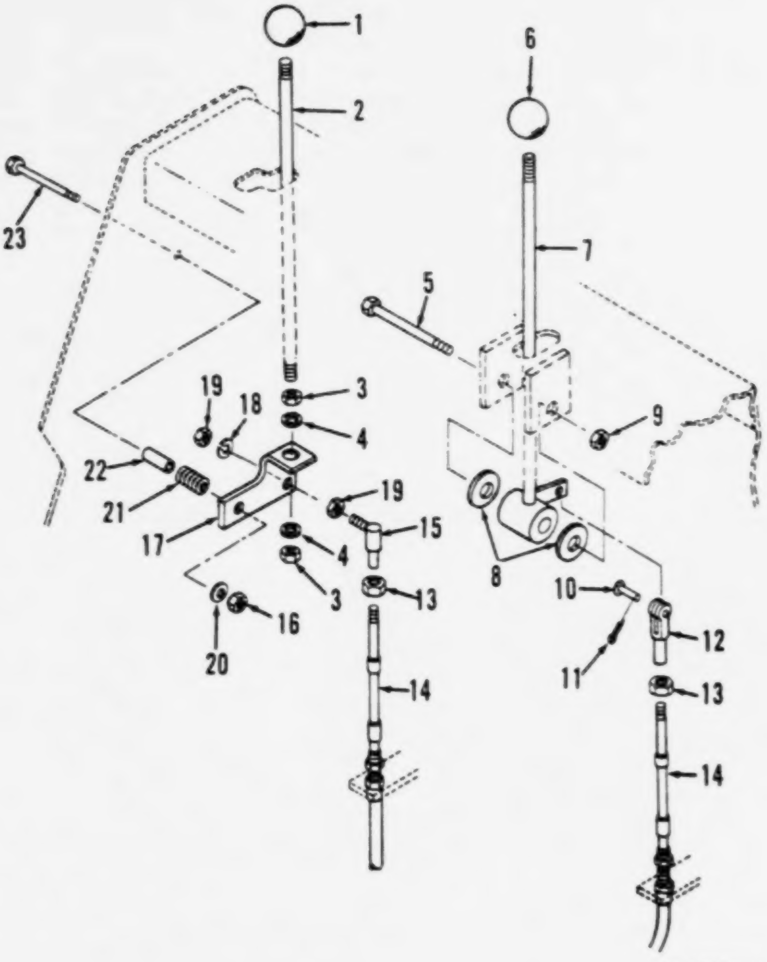
Figure 56. Modulation valve assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0721 COOLERS, PUMPS, MOTORS	
				FIG. 56 MODULATION VALVE ASSEMBLY	
1	XBHHD	12603	238085	MODULATION VALVE ASSEMBLY..........	1
2	XBHZZ	12603	236472	.SPRING, ACCUMULATOR, INNER........	2
3	XBHZZ	12603	234668	.SPRING ACCUMULATOR, OUTER.........	2
4	XAHZZ	12603	NSS	.VALVE, ACCUMULATOR.................	2
5	XBHZZ	12603	47K-7	.CAP VALVE...........................	4
6	KBHZZ	12603	91F-7	..PACKING,PREFORMED PART OF KIT P/N 801981..............................	4
7	XBHZZ	12603	234665	.SPRING, REGULATOR..................	2
8	XAHZZ	12603	NSS	.SPOOL, REGULATOR...................	2
9	PAFZZ	12603	234279	GASKET PART OF KIT P/N 801981.......	1

END OF FIGURE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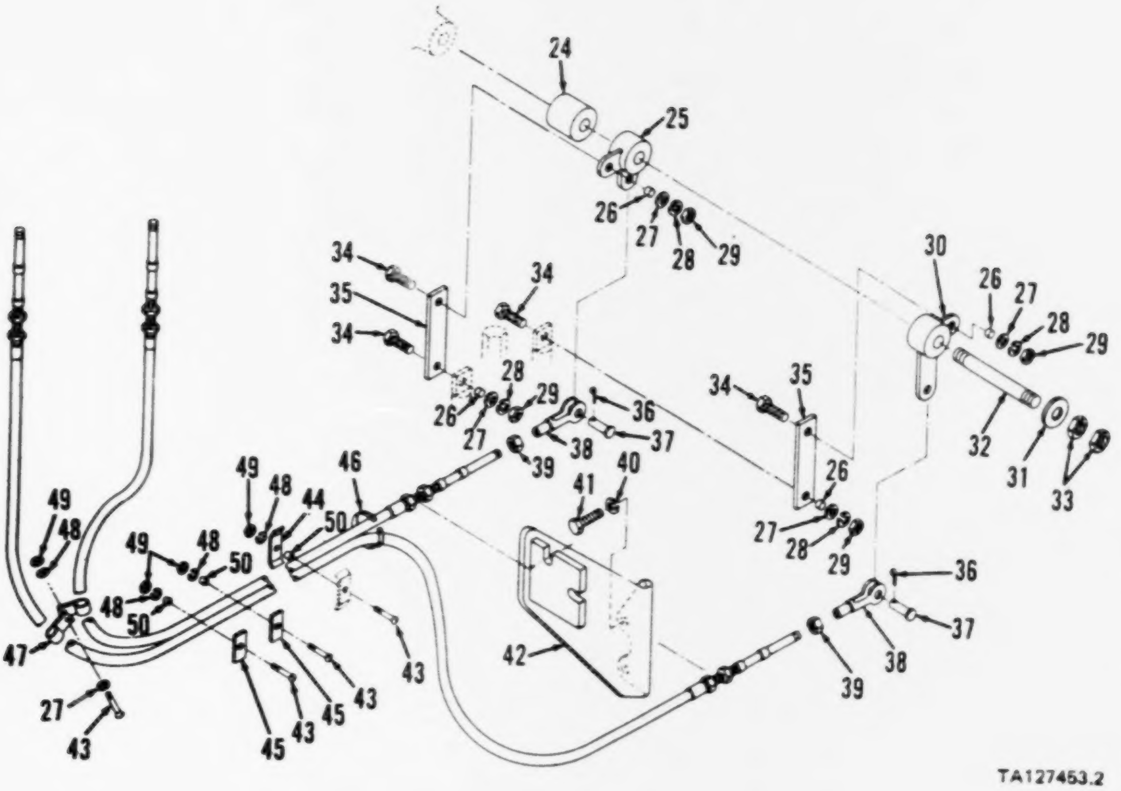
TA127483.1

Figure 57. Transmission linkage controls (Sheet 1 of 2).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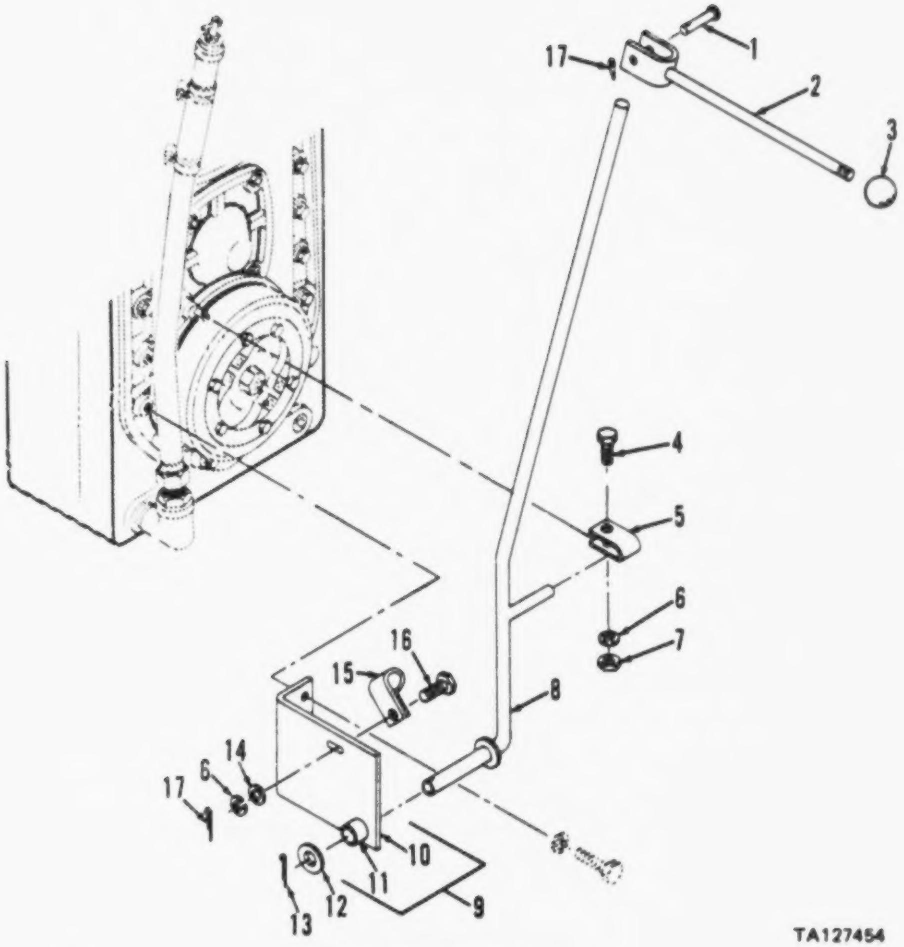
TA127453.2

Figure 57. Transmission linkage controls (Sheet 2 of 2).

GROUP 0721 COOLERS,PUMPS,MOTORS

FIG. 57 TRANSMISSION LINKAGE CONTROL

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	72512	35D	KNOB	1
2	XBOZZ	10988	L104212	LEVER, TRANSMISSION SPEED CONTROL	1
3	PAOZZ	96906	MS35691-33	NUT,PLAIN,HEXAGON	2
4	PAOZZ	96906	MS27183-19	WASHER,FLAT	2
5	PAOZZ	96906	MS90728-120	SCREW,CAP,HEXAGON H	1
6	PAOZZ	72512	35D	KNOB CONTROL LEVER	1
7	XBFFF	10988	L102625	LEVER, TRANSMISSION CONTROL	1
8	PAOZZ	96906	MS27183-19	WASHER,FLAT	2
9	PAOZZ	96906	MS51922-33	NUT,SELF-LOCKING,HE	1
10	PAOZZ	96906	MS35810-2	PIN STRAIGHT HEADED	1
11	PAOZZ	96906	MS9245-27	PIN,COTTER	1
12	PAOZZ	10988	213-2	CLEVIS,ROD END	1
13	PAOZZ	96906	MS35691-5	NUT,PLAIN,HEXAGON	2
14	PAOZZ	06970	183-L-T-T-2-112	CABLE,TRANSMISSON C CONTROL	2
15	PAOZZ	01428	SPG1002	BALL JOINT	1
16	PAOZZ	96906	MS51922-33	NUT,SELF-LOCKING,HE	1
17	XBOZZ	10988	L100729	BRACKET, SUPPORT	1
18	PAOZZ	96906	MS35338-44	WASHER,LOCK	1
19	PAOZZ	96906	MS51968-2	NUT,PLAIN,HEXAGON	1
20	PAOZZ	10988	R24718	SPACER,PLATE	1
21	PAOZZ	73821	C1100-125-3000M	SPRING,HELICAL,COMP COMPRESSION	1
22	XBOZZ	10988	L102627	SPACER	1
23	PAOZZ	96906	MS90728-121	SCREW,CAP,HEXAGON H	1
24	XBOZZ	10988	L103593	SPACER	1
25	XBOZZ	10988	L103595	BELLCRANK TRANSMISSION, INSIDE	1
26	XBOZZ	10988	L13111	SPACER	4
27	PAOZZ	96906	MS27183-13	WASHER,FLAT	5
28	PAOZZ	96906	MS35338-45	WASHER,LOCK	4
29	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	4
30	XBOZZ	10988	L103596	BELLCRANK TRANSMISSION, OUTSIDE	1
31	PAOZZ	10988	D64050	WASHER,FLAT	1
32	PAOZZ	10988	L-103592	STUD,PLAIN	1
33	PAOZZ	96906	MS35691-33	NUT,PLAIN,HEXAGON	2
34	PAOZZ	96906	MS90725-34	BOLT,MACHINE	4
35	PAOZZ	10988	L78367	CONNECTING LINK,RIG	2
36	PAOZZ	96906	MS9245-27	PIN,COTTER	2
37	PAOZZ	96906	MS35810-3	PIN,STRAIGHT,HEADED	2
38	PAOZZ	10988	A18709	CLEVIS,ROD END	2
39	PAOZZ	96906	MS35691-5	NUT,PLAIN,HEXAGON	2
40	PAOZZ	96906	MS35338-47	WASHER,LOCK	2
41	PAOZZ	96906	MS90725-89	SCREW,CAP,HEXAGON H	2
42	XBOZZ	10988	L103599	BRACKET	1
43	PAOZZ	96906	MS90725-32	BOLT,MACHINE	4
44	XBOZZ	10988	A14078	CLAMP, HOSE	1
45	PAOZZ	10988	A12032	STRAP,RETAINING DOWN	2
46	XBOZZ	06383	SST-2-S	TILE CABLE	2
47	XDOZZ	10988	49854	CLAMP,LOOP	2
48	PAOZZ	96906	MS35338-45	WASHER,LOCK	4
49	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	4
50	PAOZZ	10988	D-35217	SPACER,SLEEVE	3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TA127454

Figure 58. Axle disconnect.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0721 COOLERS,PUMPS,MOTORS	
				FIG. 58 AXLE DISCONNECT	
1	XBOZZ	10988	141-60	PIN, STRAIGHT HEADED..................	1
2	XBOZZ	10988	L104053	LEVER, AXLE DISCONNECT...............	1
3	PAOZZ	80813	95	KNOB DISCONNECT.......................	1
4	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H..................	1
5	PAOZZ	10988	L103385	CLAMP,LOOP DISCONNECT................	1
6	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	2
7	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	2
8	XBOZZ	10988	L104075	LEVER, AXLE DISCONNECT, LOWER......	1
9	XBOZZ	10988	L103692	BRACKET, AXLE........................	1
10	XAOZZ	10988	L103539	.BRACKET, AXLE DISCONNECT...........	1
11	PAOZZ	10988	L103697	.BEARING,SLEEVE......................	1
12	PAOZZ	96906	MS27183-19	WASHER,FLAT..........................	1
13	PAOZZ	96906	MS24665-353	PIN,COTTER...........................	1
14	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	1
15	PAOZZ	10988	D40471	CLAMP,LOOP...........................	2
16	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	1
17	PAOZZ	96906	MS24665-283	PIN,COTTER...........................	1

END OF FIGURE

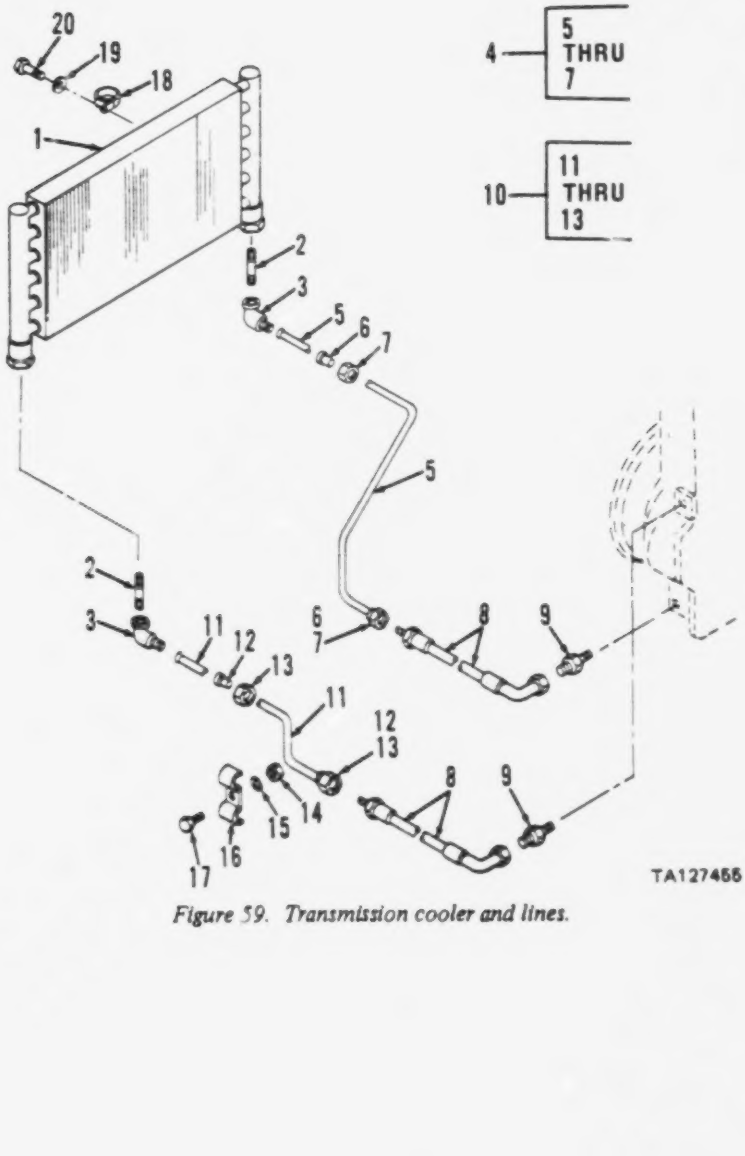
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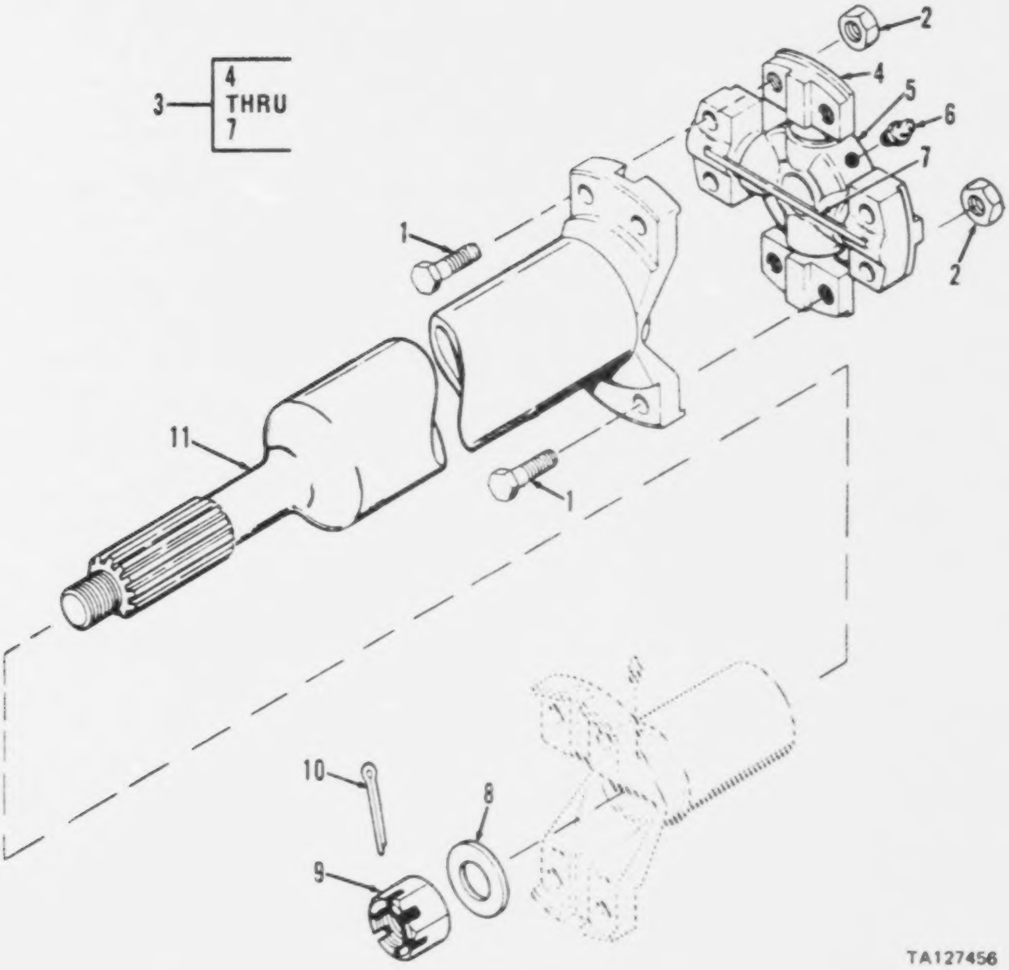
Figure 59. Transmission cooler and lines.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0721 COOLERS,PUMPS,MOTORS	
				FIG. 59 TRANSMISSION COOLER AND LINES	
1	PAOOO	10119	10924S1-10	COOLER,FLUID,TRANSM TRANSMISSION...	1
2	PAOZZ	96906	MS51953-102	NIPPLE,PIPE.........................	2
3	XBOZZ	10988	218-516	FITTING, TUBE.......................	2
4	XBOZZ	10988	L103730	TUBE ASSY COOLER TO TRANSMISSION...	1
5	XAOZZ	10988	L103729	.TUBE...............................	1
6	XBOZZ	10988	218-366	.SLEEVE,FLARED,TUBE.................	2
7	PAOZZ	10988	218-346	.NUT,TUBE COUPLING..................	2
8	PAOZZ	10988	L103731	HOSE ASSY,NONMETALL TO COOLER......	2
9	PAOZZ	96906	MS51525-A12	ADAPTER,STRAIGHT,TU STRAIGHT.......	2
10	PAOZZ	10988	L103728	TUBE,BENT,METALLIC TRANSMISSION TO COOLER.............................	1
11	PAOZZ	10988	L103728	.TUBE,BENT,METALLIC.................	1
12	XBOZZ	10988	218-366	.SLEEVE,FLARED,TUBE.................	2
13	XAOZZ	10988	218-346	.NUT,TUBE COUPLING PART OF KIT P/N L103728..............................	2
14	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON...................	1
15	PAOZZ	96906	MS35338-46	WASHER,LOCK.........................	1
16	PAOZZ	10988	R15257	STRAP,RETAINING.....................	1
17	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H.................	1
18	XDFZZ	84971	TA021 24 CO-18NB	CLAMP,LOOP MOUNTING.................	4
19	PAOZZ	96906	MS35338-45	WASHER,LOCK.........................	4
20	PAOZZ	96906	MS90725-32	BOLT,MACHINE........................	4

END OF FIGURE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TA127456

Figure 60. Front drive shaft assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 09 PROPELLER AND PROPELLER SHAFTS	
				GROUP 0900 PROPELLER SHAFTS	
				FIG. 60 FRONT DRIVE SHAFT ASSEMBLY	
	PAFFF	78500	965-64-42736	PROPELLER SHAFT ASSEMBLY, FRONT....	1
1	PAFZZ	70960	CSH6-24-20	.SCREW,CAP,HEXAGON H................	4
2	PAFZZ	96906	MS35691-21	.NUT,PLAIN,HEXAGON..................	4
3	PAFZZ	70960	CP62N14	.UNIVERSAL JOINT....................	1
4	XAFZZ	70960	62N4-4A	..NEEDLE, BEARING...................	4
5	XAFZZ	70960	62N1A	..CENTER............................	1
6	PAFZZ	70960	1610BL	..FITTING,LUBRICATION LUBRICATION..	1
7	XAFZZ	70960	WSP1-76-1	..STRAP.............................	1
8	PAFZZ	70960	WAR20-1	.WASHER,FLAT........................	1
9	PAFZZ	70960	NUSL20-18-1	.NUT,PLAIN,SLOTTED,H................	1
10	PAFZZ	96906	MS24665-362	.PIN,COTTER.........................	1
11	XAFZZ	70960	965-65-42736	.DRIVE SHAFT, FRONT.................	1

END OF FIGURE

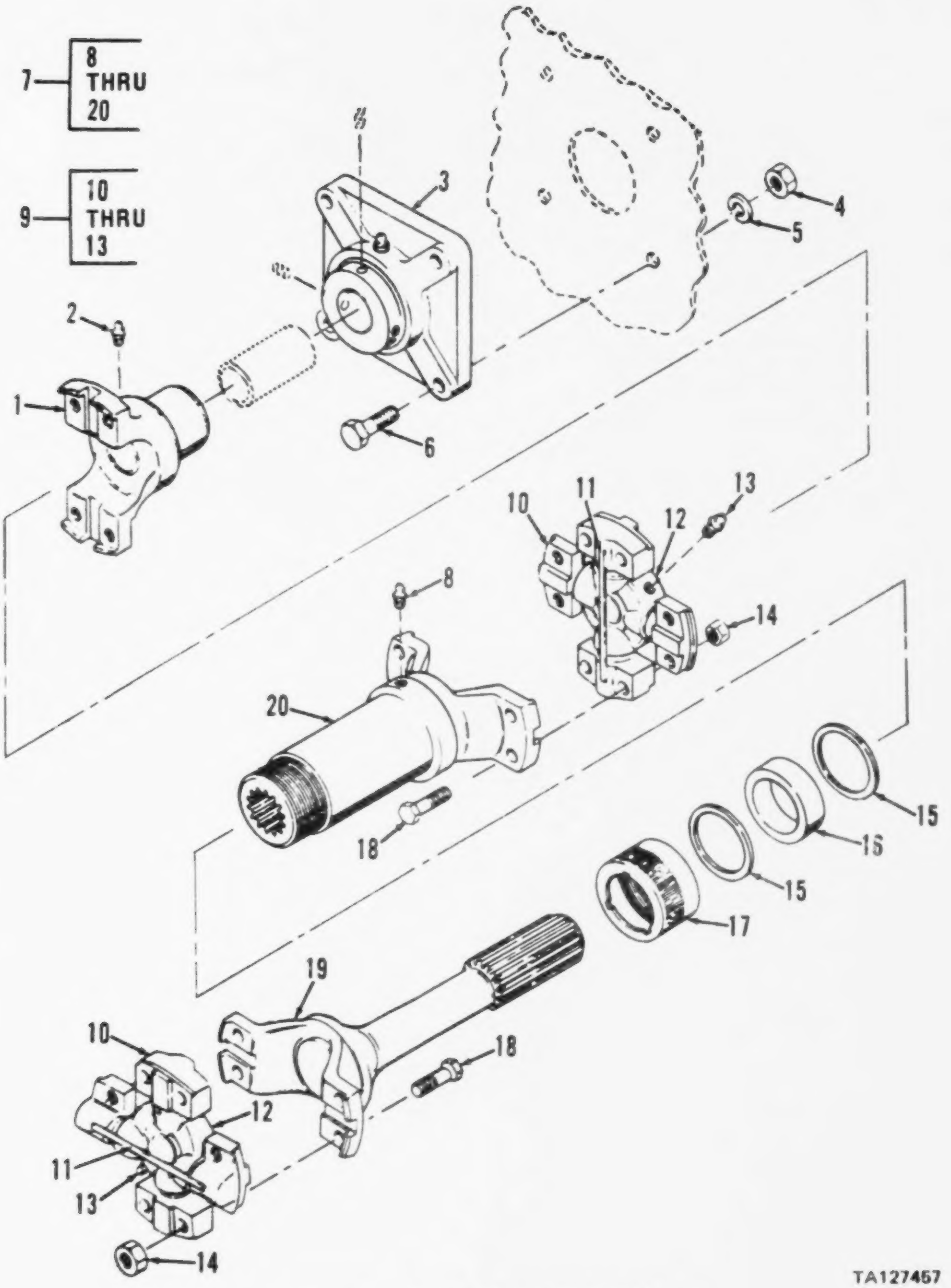
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Figure 61. Center drive shaft assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0900 PROPELLER SHAFTS	
				FIG. 61 CENTER DRIVE SHAFT ASSEMBLY	
1	PAFZZ	70960	62NYS28-129	SHAFT..................................	1
2	PAFZZ	96906	MS15003-6	FITTING,LUBRICATION LUBRICATION....	1
3	PAFZZ	02695	SF32RTC	BEARING UNIT,BALL SHAFT SUPPORT....	1
4	PAFZZ	96906	MS51967-17	NUT,PLAIN,HEXAGON....................	4
5	PAFZZ	96906	MS35338-49	WASHER,LOCK..........................	4
6	PAFZZ	96906	MS90725-139	SCREW,CAP,HEXAGON H..................	4
7	PAFFF	10988	L60072	PROPELLER SHAFT CENTER..............	1
8	PAFZZ	70960	1610BL	.FITTING,LUBRICATION LUBRICATION...	1
9	PAFZZ	70960	CP62N14	.UNIVERSAL JOINT.....................	2
10	XAFZZ	70960	62N4-4A	..NEEDLE, BEARING....................	4
11	XAFZZ	70960	WSP1-76-1	..STRAP..............................	1
12	XAFZZ	70960	62N1A	..CENTER.............................	1
13	PAFZZ	70960	1610BL	..FITTING,LUBRICATION LUBRICATION..	1
14	PAFZZ	96906	MS35691-21	.NUT,PLAIN,HEXAGON..................	8
15	KFFZZ	70960	WAR23-1	.WASHER, PART OF KIT PART OF KIT P/N DC62N1.............................	2
16	XDFZZ	70960	WAFR24-5	.WASHER,FLAT PART OF KIT P/N DC62N1.	1
17	KFFZZ	70960	DCD36-3	.CAP, PART OF KIT PART OF KIT P/N DC62N1...............................	1
18	PAFZZ	70960	CSH6-24-20	.SCREW,CAP,HEXAGON H.................	8
19	PAFZZ	70960	62NYSM32-31	.YOKE,UNIVERSAL JOIN.................	1
20	PAFZZ	70960	62NLS32-9	.PROPELLER SHAFT.....................	1

END OF FIGURE

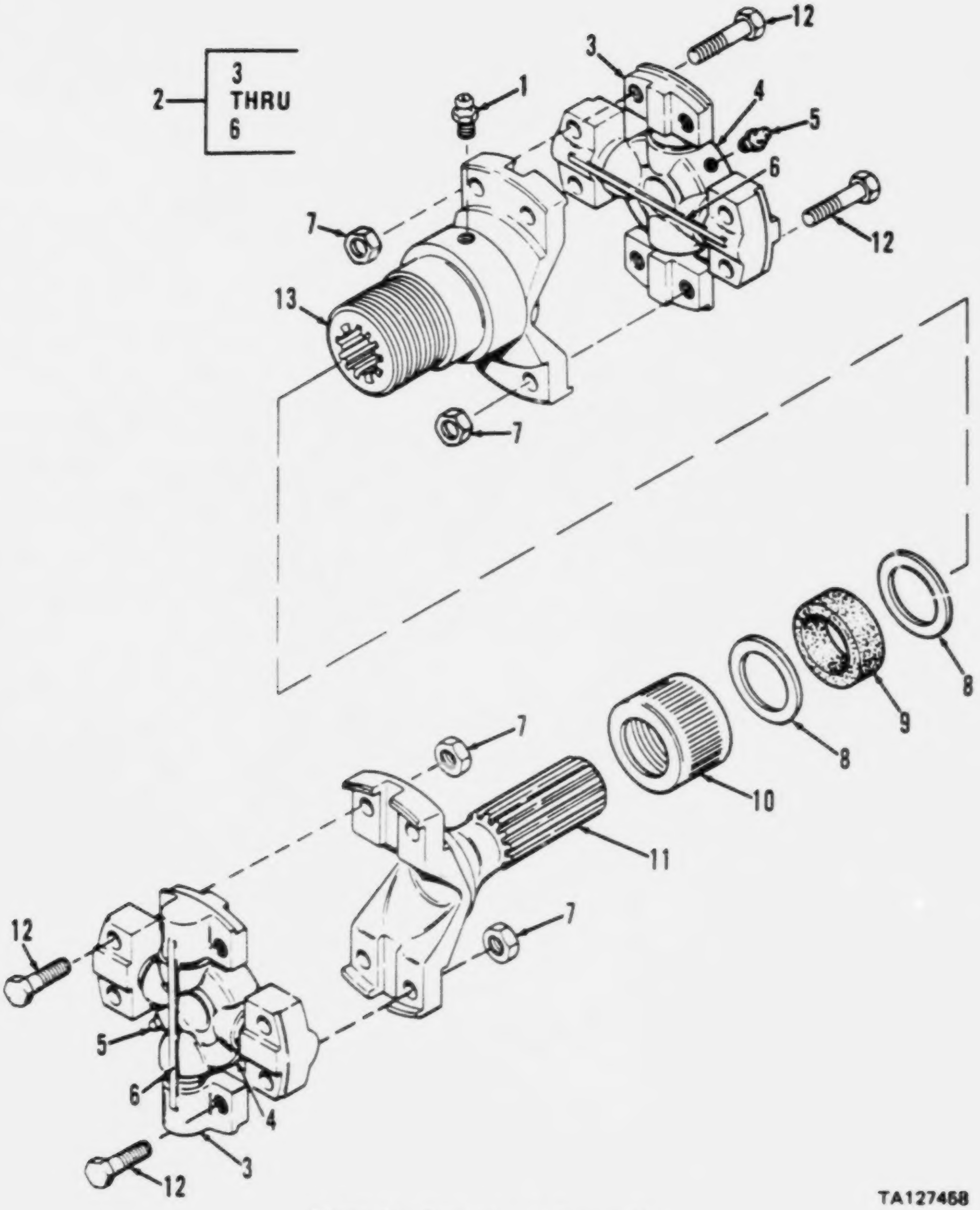
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Figure 62. Rear drive shaft assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 0900 PROPELLER SHAFTS	
				FIG. 62 REAR DRIVE SHAFT ASSEMBLY	
	PAFZZ	70960	965-92-39087	PROPELLER SHAFT WIT REAR...........	1
1	PAFZZ	70960	1610-BL	.FITTING,LUBRICATION LUBRICATION...	1
2	PAFZZ	70960	CP62N14	.UNIVERSAL JOINT....................	2
3	XAFZZ	70960	62N4-4A	..NEEDLE, BEARING...................	4
4	XAFZZ	70960	62N1A	..CENTER............................	1
5	PAFZZ	70960	1610BL	..FITTING,LUBRICATION LUBRICATION..	1
6	XAFZZ	70960	WSP1-76-1	..STRAP.............................	1
7	PAFZZ	96906	MS35691-21	.NUT,PLAIN,HEXAGON..................	8
8	KFFZZ	70960	WAR23-1	.WASHER, PART OF KIT P/N DC62N1 PART OF KIT P/N DC62N1..............	2
9	XDFZZ	70960	WAFR24-5	.WASHER,FELT PART OF KIT P/N DC62N1.........................	1
10	KFFZZ	70960	DCD36-3	.CAP, PART OF KIT P/N DC62N1...............................	1
11	PAFZZ	70960	62NYSM28-9	.YOKE,UNIVERSAL JOIN................	1
12	PAFZZ	70960	CSH6-24-20	.SCREW,CAP,HEXAGON H................	8
13	PAFZZ	70960	62NLS28-1	.YOKE,UNIVERSAL JOIN................	1

END OF FIGURE

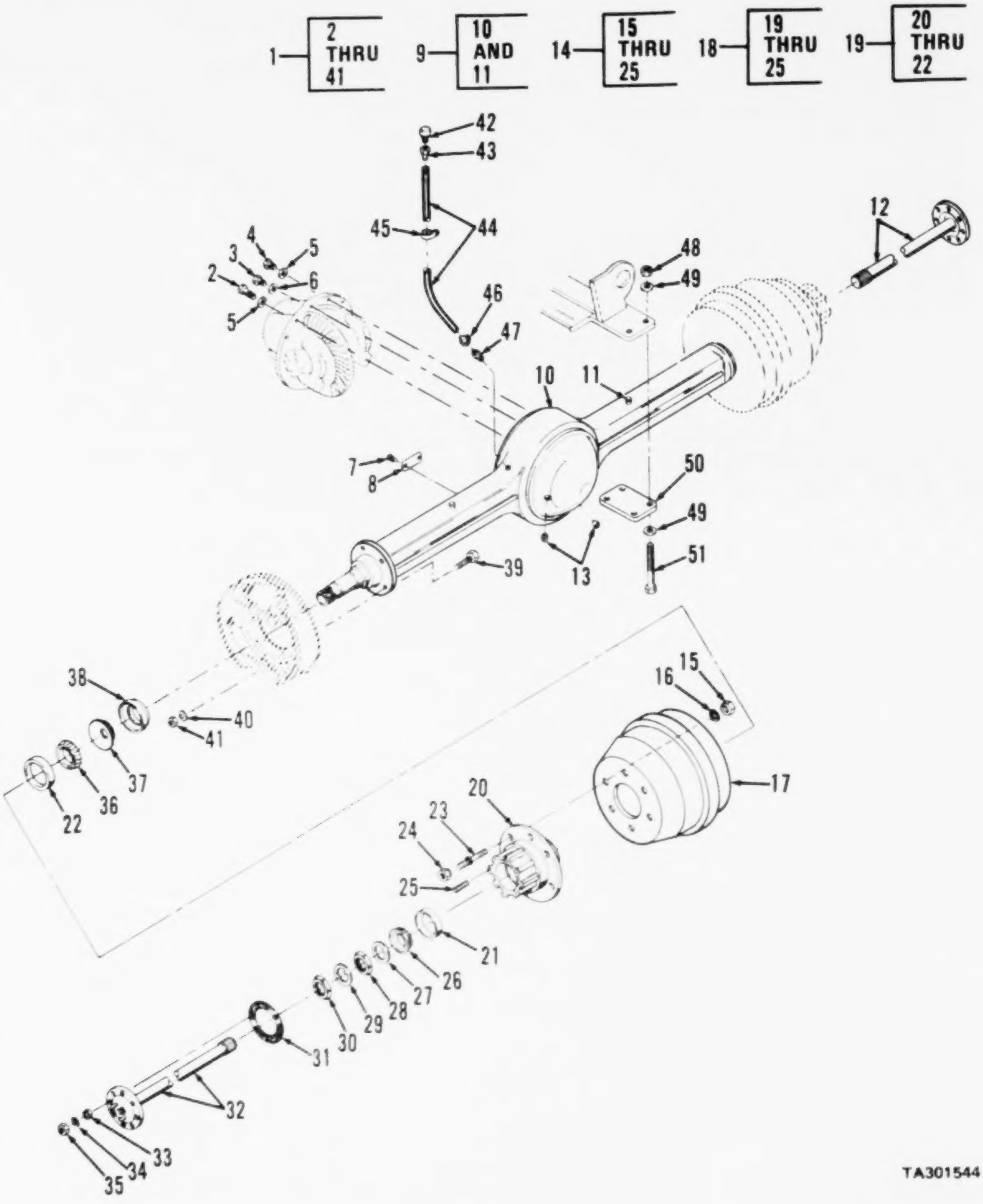
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Figure 63. Front axle assembly and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 10 FRONT AXLE	
				GROUP 1000 FRONT AXLE ASSEMBLY	
				FIG. 63 FRONT AXLE ASSEMBLY AND MOUNTING	
1	PAFHD	78500	D-140-FSHX20	AXLE ASSEMBLY,AUTOM	1
2	PAFZZ	96906	MS90728-92	.SCREW,CAP,HEXAGON H	2
3	PAFZZ	96906	MS90728-113	.SCREW,CAP,HEXAGON H SHORT	12
4	PAFZZ	96906	MS90728-89	.SCREW,CAP,HEXAGON H SHORT	2
5	PAFZZ	78500	1229E1513	.WASHER,FLAT	4
6	XDFZZ	78500	1229C1511	.WASHER,FLAT	12
7	PAFZZ	78500	9X16	.SCREW	2
8	PAFZZ	78500	3280S7533	.PLATE,IDENTIFICATIO IDENTIFICATION	1
9	XBHDD	78500	C3121N456	.HOUSING ASSEMBLY AXLE	1
10	XADZZ	78500	A3121N456	..HOUSING, AXLE	1
11	PAHZZ	78500	1246B288	..PIN,SHOULDER,HEADLE	2
12	PAFZZ	78500	3202-Q-7869	SHAFT,AXLE	1
13	PAFZZ	03958	MS49005-10	.PLUG,PIPE	2
14	XBFHH	78500	B53-333H268	.HUB AND DRUM ASSY	2
15	PAFZZ	96906	MS51968-14	..NUT,PLAIN,HEXAGON	6
16	PAFZZ	78500	1229-V-1504	..WASHER,FLAT	6
17	XBFZZ	78500	3719W23	..DRUM, BRAKE	1
18	XBFHH	78500	B52-333H268	..HUB AND STUD ASSY	1
19	XBFHH	78500	A333H268	...HUB AND CUP ASSY	1
20	XAFZZ	78500	333H268	....HUB	1
21	PAFZZ	78500	462	.BEARING,ROLLER,TAPE OUTER	2
22	PAFZZ	78500	3984	.CONE AND ROLLERS,TA INNER	2
23	PAFZZ	78500	20X-1556-S	...STUD,SHOULDERED AND	6
24	PAOZZ	96906	MS51983-3	...NUT,PLAIN,SINGLE BA	6
25	PAFZZ	78500	SC-716	...STUD,PLAIN	8
26	PAFZZ	78500	453X	....BEARING,ROLLER,TAPE	1
27	XBFZZ	78500	1229R720	.BEARING,WASHER,THRU	2
28	PAFZZ	78500	1227F162	.NUT,PLAIN,HEXAGON INNER	2
29	PAFZZ	78500	1229S721	.WASHER,KEY	2
30	PAFZZ	78500	1227F162	.NUT,PLAIN,HEXAGON OUTER	2
31	PAFZZ	78500	2208U411	.GASKET	2
32	PAFZZ	78500	3202-P-7868	SHAFT,AXLE	1
33	PAFZZ	78500	1246X232	.BUSHING,TAPERED	16
34	PAFZZ	96906	MS35335-36	.WASHER,LOCK	16
35	PAFZZ	96906	MS51968-11	.NUT,PLAIN,HEXAGON	16
36	PAFZZ	78500	3920	....CUP,TAPERED ROLLER	1
37	XBFZZ	78500	3905L90	.SLINGER, OIL	2
38	PAFZZ	78500	A-1205-T-1502-S	.SEAL,PLAIN,ENCASED	2
39	PAFZZ	96906	MS90727-113	.SCREW,CAP,HEXAGON H	12
40	XDFZZ	78500	1229C1511	.WASHER,FLAT	12
41	PAFZZ	96906	MS51922-37	.NUT,SELF-LOCKING,HE	12
42	PAOZZ	95879	301370	FITTING,LUBRICATION	1
43	PAOZZ	30327	KF04-02RS	ADAPTER,STRAIGHT,PI	1
44	MOOZZ	10988	L60451	HOSE,NONMETALLIC MAKE FROM P/N SAE30R2TYPE1-1-4ID	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
45	PAOZZ	10988	49838	CLAMP,LOOP............................	1
46	PAOZZ	10988	214-274	CLAMP,HOSE............................	1
47	PAOZZ	30327	KF04-02PS	ADAPTER,STRAIGHT,PI...................	1
48	PAFZZ	96906	MS51922-53	NUT,SELF-LOCKING,HE...................	2
49	XDFZZ	10988	D43266	WASHER................................	16
50	XBFZZ	10988	L60186	PLATE, LOWER AXLE SUPPORT...........	2
51	PAFZZ	10988	28-10120	BOLT,MACHINE..........................	8

END OF FIGURE

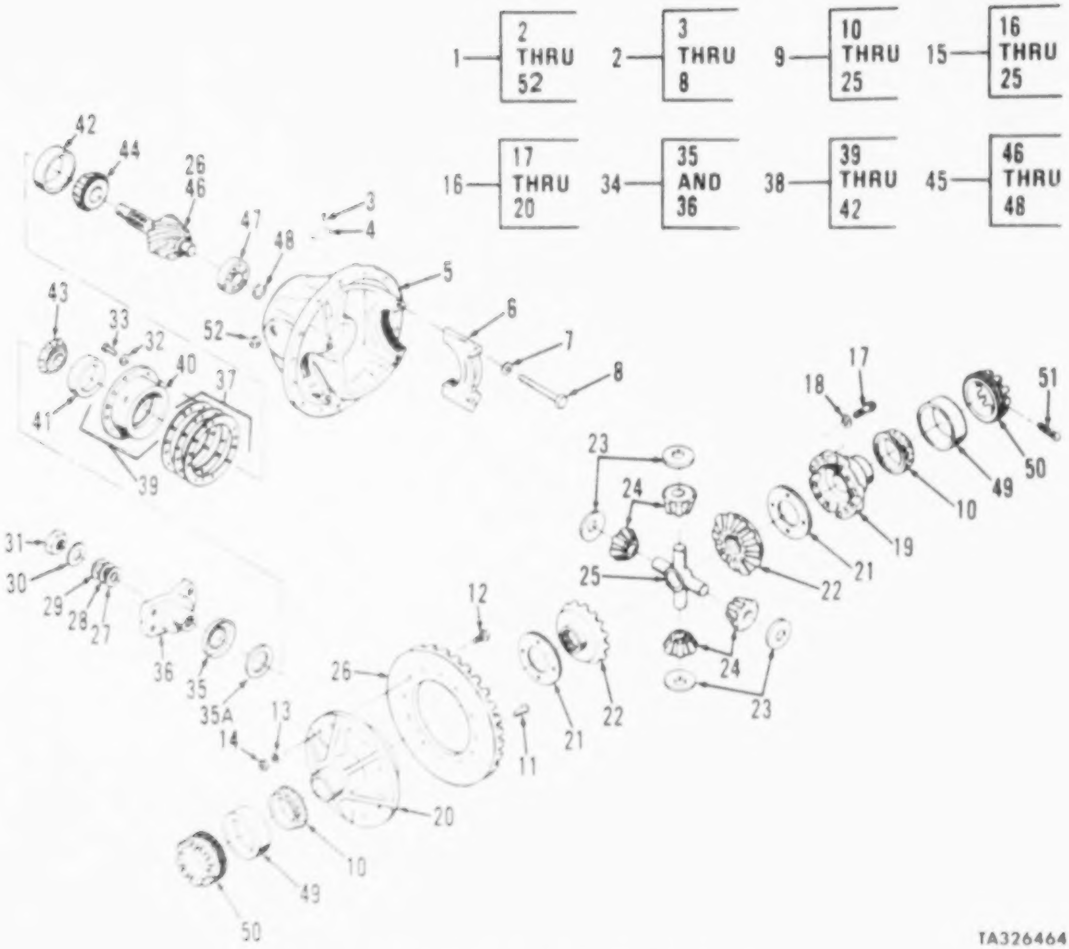
1 — 2 THRU 52
2 — 3 THRU 8
9 — 10 THRU 25
15 — 16 THRU 25
16 — 17 THRU 20
34 — 35 AND 36
38 — 39 THRU 42
45 — 46 THRU 48
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Figure 64. Front axle differential carrier assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1002 DIFFERENTIAL	
				FIG. 64 FRONT AXLE DIFFERENTIAL CARRIER ASSEMBLY	
1	PAFHD	78500	G16-3200-S-1111/680	DIFFERENTIAL,DRIVEN	1
2	XAHHH	78500	A2-3200S1111	.CAP AND CARRIER ASSEMBLY	1
3	PAHZZ	78500	9X16	..SCREW	2
4	XDHZZ	78500	1199K1493	..PLATE,IDENTIFICATIO IDENTIFICATION	1
5	XAHZZ	78500	3200S1111	..CARRIER DIFFERENTIAL	1
6	XBHZZ	78500	3212Q355	..CAP, BEARING	2
7	PAHZZ	78500	1229U1503	..WASHER,FLAT	4
8	PAHZZ	80194	S-210281	..TUBE ASSEMBLY,METAL	4
9	XBHHH	78500	B993235884	.CASE AND GEAR ASSY, DIFFERENTIAL	1
10	PAHZZ	78500	3994	..CONE AND ROLLERS,TA	2
11	XBHZZ	78500	RV7812	..RIVET	12
12	PAHZZ	78500	15X-1325-S	..SCREW,MACHINE	12
13	XDHZZ	78500	1229C1511	..WASHER,FLAT	12
14	PAHZZ	96906	MS51922-37	..NUT,SELF-LOCKING,HE	12
15	XAHHH	78500	A8-3235Z884	..DIFFERENTIAL ASSY DIFFERENTIAL	1
16	XBHHH	78500	A1-3235Z884	...CASE ASSEMBLY	1
17	PAHZZ	78500	15X-1083	....SCREW	8
18	XDHZZ	78500	1229C1511	....WASHER,FLAT	8
19	XAHZZ	78500	3235W413	....CASE, DIFFERENTIAL PLAIN HALF	1
20	XAHZZ	78500	3235Z884	....CASE, DIFFERENTIAL FLANGE HALF.	1
21	PAHZZ	78500	1229Y883	...SPACER,PLATE	2
22	PAHZZ	78500	2234-N-872	...GEAR,BEVEL	2
23	PAHZZ	78500	1229U1061	...WASHER,SPRING TENSI	4
24	PAHZZ	78500	2233A105	...GEAR,BEVEL	4
25	PAHZZ	78500	3278Z104	...SPIDER,DIFFERENTIAL	1
26	PAHZZ	78500	A-35510-7	.GEAR SET,BEVEL,MATC PINION	1
27	PAHZZ	78500	2203X2728	.SHIM	1
28	PAHZZ	78500	2203Y2729	.SHIM	3
29	PAHZZ	78500	2203Z2730	.SHIM	4
30	PAHZZ	78500	1229E1331	.WASHER,FLAT	1
31	PAHZZ	78500	1227-C-939	.NUT,SELF-LOCKING,CA	1
32	PAHZZ	78500	1229E1513	.WASHER,FLAT	8
33	PAHZZ	96906	MS90728-89	.SCREW,CAP,HEXAGON H	8
34	PAHZZ	78500	A1-3897-X-1896	.YOKE,UNIVERSAL JOIN COMPANION	1
35	XBHZZ	78500	2297B3096	..SLINGER, OIL	1
35A	PAHZZ	78500	A-1205-S-1527	..SEAL,PLAIN ENCASED	1
36	XAHZZ	78500	3897X1896	..YOKE, COMPANION	1
37	XBHZZ	78500	2203S6935	.SHIM, 0.308	1
37	XBHZZ	78500	2203T6936	.SHIM, 0.309	1
37	XBHZZ	78500	2203U6937	.SHIM, 0.310	1
37	XBHZZ	78500	2203V6938	.SHIM, 0.311	1
37	XBHZZ	78500	2203W6939	.SHIM, 0.312	1
37	XBHZZ	78500	2203X6940	.SHIM, 0.313	1
37	XBHZZ	78500	2203Y6941	.SHIM 0.314	1
37	XBHZZ	78500	2203Z6942	.SHIM, 0.315	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
37	XBHZZ	78500	2203A6943	.SHIM, 0.316	1
37	XBHZZ	78500	2203B6944	.SHIM, 0.317	1
37	XBHZZ	78500	2203B6945	.SHIM, 0.318	1
37	XBHZZ	78500	2203D6946	.SHIM, 0.319	1
37	XBHZZ	78500	2203E6947	.SHIM, 0.320	1
37	XBHZZ	78500	2203F6948	.SHIM, 0.321	1
37	XBHZZ	78500	2203G6949	.SHIM, 0.322	1
37	XBHZZ	78500	2203H6950	.SHIM, 0.323	1
37	XBHZZ	78500	2203J6952	.SHIM, 0.324	1
37	XBHZZ	78500	2203K6953	.SHIM, 0.325	1
37	XBHZZ	78500	2203L6954	.SHIM, 0.326	1
37	XBHZZ	78500	2203M6955	.SHIM, 0.327	1
37	XBHZZ	78500	2203N6956	.SHIM, 0.328	1
37	XBHZZ	78500	2203Q6959	.SHIM, 0.330	1
37	XBHZZ	78500	2203R6960	.SHIM, 0.331	1
37	XBHZZ	78500	2203S6961	.SHIM, 0.332	1
37	XBHZZ	78500	2203T6962	.SHIM, 0.333	1
37	XBHZZ	78500	2203U6963	.SHIM, 0.334	1
37	XBHZZ	78500	2203V6964	.SHIM, 0.335	1
37	XBHZZ	78500	2203W6965	.SHIM, 0.336	1
37	XBHZZ	78500	2203X6966	.SHIM, 0.337	1
37	XBHZZ	78500	2203Y6967	.SHIM, 0.338	1
37	XBHZZ	78500	2203Y6968	.SHIM, 0.339	1
37	XBHZZ	78500	2203G6923	.SHIM, 0.153	2
37	XBHZZ	78500	2203H6924	.SHIM, 0.154	2
37	XBHZZ	78500	2203J6926	.SHIM, 0.155	2
37	XBHZZ	78500	2203K6927	.SHIM, 0.156	2
37	XBHZZ	78500	2203L6928	.SHIM, 0.157	2
37	XBHZZ	78500	2203M6929	.SHIM, 0.158	2
37	XBHZZ	78500	2203N6930	.SHIM, 0.164	2
37	XBHZZ	78500	2203P6932	.SHIM, 0.170	2
37	XBHZZ	78500	2203Q6933	.SHIM, 0.176	2
37	XBHZZ	78500	2203R6934	.SHIM, 0.182	2
38	XBHHH	78500	A2-3226F655	.CAGE ASSEMBLY PINION	1
39	XBHZZ	78500	43226E655	..CAGE, ASSEMBLY PINION	1
40	XBHZZ	78500	3226E655	...CAGE, PINION	1
41	PAHZZ	78500	44348	..CUP,TAPERED ROLLER	1
42	PAHZZ	78500	HM803110	..CUP,TAPERED ROLLER	1
43	PAHZZ	78500	44143	.CONE AND ROLLERS,TA OUTER	1
44	PAHZZ	60038	HM-803146	.CONE AND ROLLERS,TA INNER	1
45	XBHHH	78500	436169	.PINION ASSEMBLY	1
46	XBHZZ	78500	36169	..PINION, BEVEL	1
47	PAHZZ	78500	1228H268	..BEARING,ROLLER,CYLI	1
48	PAHZZ	78500	1229W1167	..RING,RETAINING	1
49	PAHZZ	78500	JM511910	.CUP,TAPERED ROLLER	2
50	PAHZZ	78500	2214E57	.RING,EXTERNALLY THR ADJUSTING	2
51	PAHZZ	78500	1199R2176	.PIN,COTTER	2
52	PAHZZ	89345	9409949	.PLUG,PIPE	1

END OF FIGURE

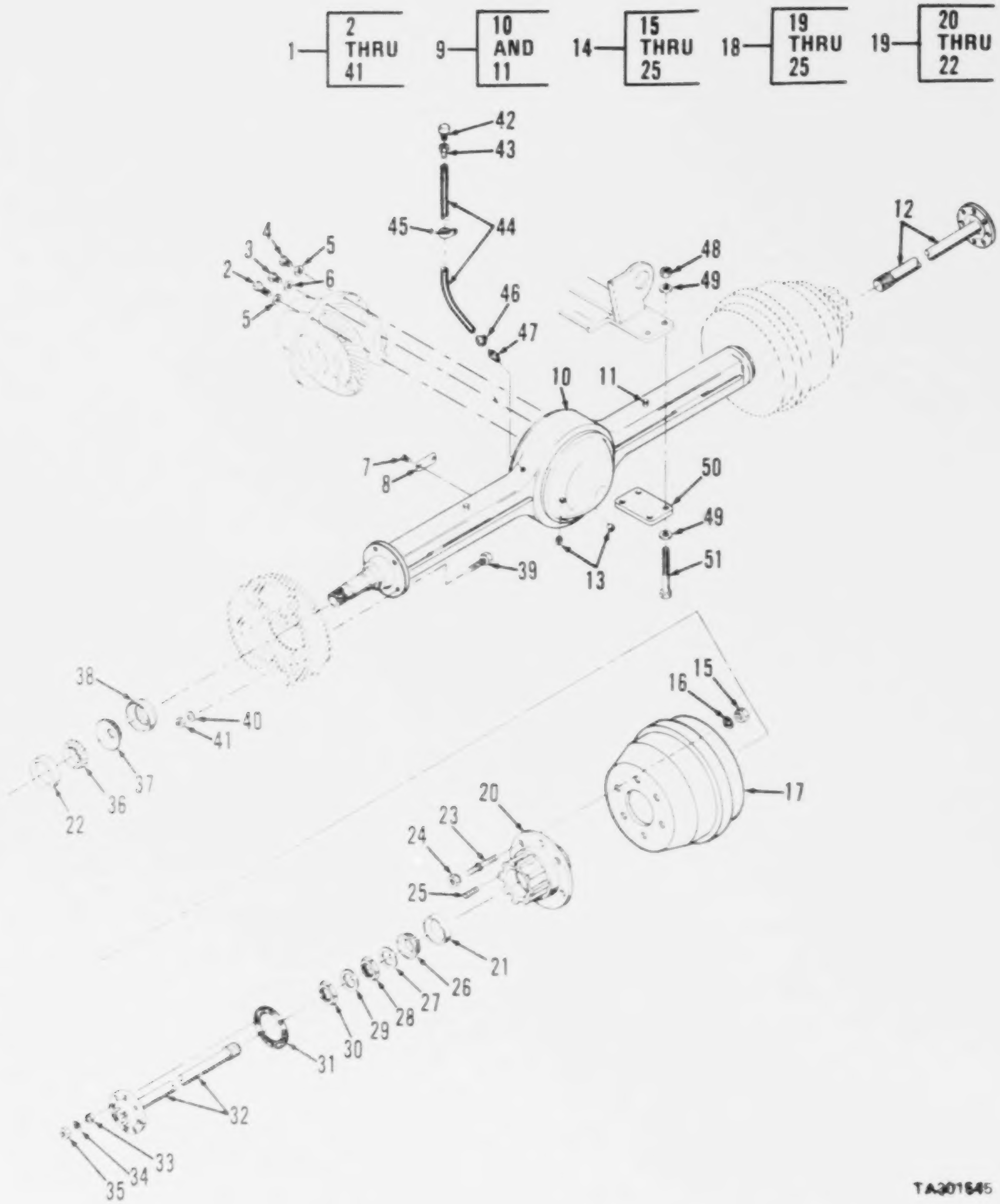
1— 2 THRU 41
9— 10 AND 11
14— 15 THRU 25
18— 19 THRU 25
19— 20 THRU 22
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Figure 65. Rear axle assembly and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 11 REAR AXLE	
				GROUP 1100 REAR AXLE ASSEMBLY	
				FIG. 65 REAR AXLE ASSEMBLY AND MOUNTING	
1	PAFHD	78500	D-140-FSHX20	AXLE ASSEMBLY,AUTOM	1
2	PAFZZ	96906	MS90728-92	.SCREW,CAP,HEXAGON H	2
3	PAFZZ	96906	MS90728-113	.SCREW,CAP,HEXAGON H SHORT	12
4	PAFZZ	96906	MS90728-89	.SCREW,CAP,HEXAGON H SHORT	2
5	PAFZZ	78500	1229E1513	.WASHER,FLAT	4
6	XDFZZ	78500	1229C1511	.WASHER,FLAT	12
7	PAFZZ	78500	9X16	.SCREW	2
8	PAFZZ	78500	3280S7533	.PLATE,IDENTIFICATIO IDENTIFICATION	1
9	XBHHD	78500	C3121N456	.HOUSING ASSEMBLY AXLE	1
10	XADZZ	78500	A3121N456	..HOUSING, AXLE	1
11	PAHZZ	78500	1246B288	..PIN,SHOULDER,HEADLE	2
12	PAFZZ	78500	3202-Q-7869	SHAFT,AXLE	1
13	PAFZZ	89345	9409949	.PLUG,PIPE	2
14	XBFHH	78500	B53-333H268	.HUB AND DRUM ASSY	2
15	PAFZZ	96906	MS51968-14	..NUT,PLAIN,HEXAGON	6
16	PAFZZ	78500	1229-V-1504	..WASHER,FLAT	6
17	XBFZZ	78500	3719W23	..DRUM, BRAKE	1
18	XBFHH	78500	B52-333H268	..HUB AND STUD ASSY	1
19	XBFHH	78500	A333H268	...HUB AND CUP ASSY	1
20	XAFZZ	78500	333H268	....HUB	1
21	PAFZZ	78500	462	.BEARING,ROLLER,TAPE OUTER	2
22	XDFZZ	78500	3984	.CONE AND ROLLERS,TA INNER	2
23	PAFZZ	78500	20X-1556-S	...STUD,SHOULDERED AND	6
24	PAOZZ	96906	MS51983-3	...NUT,PLAIN,SINGLE BA	6
25	PAFZZ	78500	SC-716	...STUD,PLAIN	8
26	PAFZZ	78500	453X	....BEARING,ROLLER,TAPE	1
27	XBFZZ	78500	1229R720	.BEARING,WASHER,THRU	2
28	PAFZZ	78500	1227F162	.NUT,PLAIN,HEXAGON INNER	2
29	PAFZZ	78500	1229S721	.WASHER,KEY	2
30	PAFZZ	78500	1227F162	.NUT,PLAIN,HEXAGON OUTER	2
31	PAFZZ	78500	2208U411	.GASKET	2
32	PAFZZ	78500	3202-P-7868	SHAFT,AXLE	1
33	PAFZZ	78500	1246X232	.BUSHING,TAPERED	16
34	PAFZZ	96906	MS35335-36	.WASHER,LOCK	16
35	PAFZZ	96906	MS51968-11	.NUT,PLAIN,HEXAGON	16
36	PAFZZ	78500	3920	CUP,TAPERED ROLLER	1
37	PAFZZ	78500	3905L90	.DEFLECTOR,DIRT AND	2
38	PAFZZ	78500	A-1205-T-1502-S	.SEAL,PLAIN,ENCASED	2
39	PAFZZ	96906	MS90727-113	.SCREW,CAP,HEXAGON H	12
40	XDFZZ	78500	1229C1511	.WASHER,FLAT	12
41	PAFZZ	96906	MS51922-37	.NUT,SELF-LOCKING,HE	12
42	PAOZZ	95879	301370	FITTING,LUBRICATION	1
43	PAOZZ	30327	KF04-02RS	ADAPTER,STRAIGHT,PI	1
44	MOOZZ	10988	L60515	HOSE,NONMETALLIC MAKE FROM P/N SAE30R2TYPE1-1-4ID	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
45	PAOZZ	10988	49838	CLAMP,LOOP..........................	1
46	PAOZZ	10988	214-274	CLAMP,HOSE..........................	1
47	PAOZZ	30327	KF04-02PS	ADAPTER,STRAIGHT,PI.................	1
48	PAFZZ	96906	MS51922-53	NUT,SELF-LOCKING,HE.................	8
49	XDFZZ	10988	D43266	WASHER..............................	16
50	XBFZZ	10988	L60186	PLATE, LOWER AXLE SUPPORT..........	2
51	PAFZZ	10988	28-10120	BOLT,MACHINE........................	8

END OF FIGURE

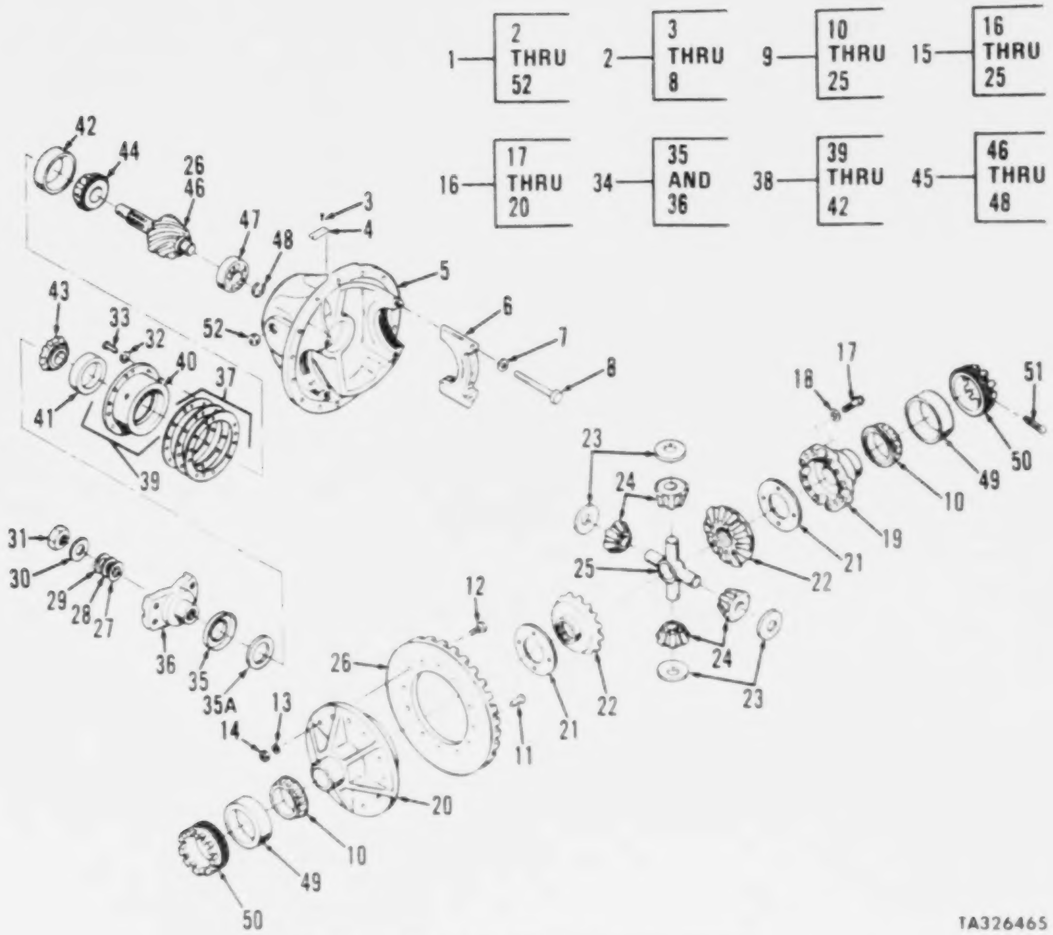
1 — 2 THRU 52
2 — 3 THRU 8
9 — 10 THRU 25
15 — 16 THRU 25
16 — 17 THRU 20
34 — 35 AND 36
38 — 39 THRU 42
45 — 46 THRU 48
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Figure 66. Rear axle differential carrier assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1102 DIFFERENTIAL	
				FIG. 66 REAR AXLE DIFFERENTIAL CARRIER ASSEMBLY	
1	PAFHD	78500	G16-3200-S-1111/680	DIFFERENTIAL,DRIVEN	1
2	XAHHH	78500	A2-3200S1111	.CAP AND CARRIER ASSEMBLY	1
3	PAHZZ	78500	9X16	..SCREW	2
4	XDHZZ	78500	1199K1493	..PLATE,IDENTIFICATIO IDENTIFICATION	1
5	XAHZZ	78500	3200S1111	..CARRIER DIFFERENTIAL	1
6	XBHZZ	78500	3212Q355	..CAP, BEARING	2
7	PAHZZ	78500	1229U1503	..WASHER,FLAT	4
8	XAHZZ	78500	S210281	..SCREW,CAP	4
9	XBHHH	78500	B993235884	.CASE AND GEAR ASSY, DIFFERENTIAL	1
10	PAHZZ	78500	3994	..CONE AND ROLLERS,TA	2
11	XBHZZ	78500	RV7812	..RIVET	12
12	PAHZZ	78500	15X-1325-S	..SCREW,MACHINE	12
13	XDHZZ	78500	1229C1511	..WASHER,FLAT	12
14	PAHZZ	96906	MS51922-37	..NUT,SELF-LOCKING,HE	12
15	XAHHH	78500	A8-3235Z884	..DIFFERENTIAL ASSY DIFFERENTIAL	1
16	XBHHH	78500	A1-3235Z884	...CASE ASSEMBLY	1
17	PAHZZ	78500	15X-1083	....SCREW	8
18	XDHZZ	78500	1229C1511	....WASHER,FLAT	8
19	XAHZZ	78500	3235W413	....CASE, DIFFERENTIAL PLAIN HALF	1
20	XAHZZ	78500	3235Z884	....CASE, DIFFERENTIAL, FLANGE HALF	1
21	PAHZZ	78500	1229Y883	...SPACER,PLATE	2
22	PAHZZ	78500	2234-N-872	...GEAR,BEVEL	2
23	PAHZZ	78500	1229U1061	...WASHER,SPRING TENSI	4
24	PAHZZ	78500	2233A105	...GEAR,BEVEL	4
25	PAHZZ	78500	3278Z104	...SPIDER,DIFFERENTIAL	1
26	PAHZZ	78500	A-35510-7	.GEAR SET,BEVEL,MATC PINION	1
27	PAHZZ	78500	2203X2728	.SHIM	1
28	PAHZZ	78500	2203Y2729	.SHIM	3
29	PAHZZ	78500	2203Z2730	.SHIM	4
30	PAHZZ	78500	1229E1331	.WASHER,FLAT	1
31	PAHZZ	78500	1227-C-939	.NUT,SELF-LOCKING,CA	1
32	PAHZZ	78500	1229E1513	.WASHER,FLAT	8
33	PAHZZ	96906	MS90728-89	.SCREW,CAP,HEXAGON H	8
34	PAHZZ	78500	A1-3897-X-1896	.YOKE,UNIVERSAL JOIN COMPANION	1
35	XBHZZ	78500	2297B3096	..SLINGER, OIL	1
35A	PAHZZ	78500	A-1205-S-1527	..SEAL,PLAIN ENCASED	1
36	XAHZZ	78500	3897X1896	..YOKE COMPANION	1
37	XBHZZ	78500	2203S6935	.SHIM, 0.308	1
37	XBHZZ	78500	2203T6936	.SHIM, 0.309	1
37	XBHZZ	78500	2203U6937	.SHIM, 0.310	1
37	XBHZZ	78500	2203V6938	.SHIM, 0.311	1
37	XBHZZ	78500	2203W6939	.SHIM, 0.312	1
37	XBHZZ	78500	2203X6940	.SHIM, 0.313	1
37	XBHZZ	78500	2203Y6941	.SHIM, 0.314	1
37	XBHZZ	78500	2203Z6942	.SHIM, 0.315	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
37	XBHZZ	78500	2203A6943	.SHIM, 0.316	1
37	XBHZZ	78500	2203B6944	.SHIM, 0.317	1
37	XBHZZ	78500	2203B6945	.SHIM, 0.318	1
37	XBHZZ	78500	2203D6946	.SHIM, 0.319	1
37	XBHZZ	78500	2203E6947	.SHIM, 0.320	1
37	XBHZZ	78500	2203F6948	.SHIM, 0.321	1
37	XBHZZ	78500	2203G6949	.SHIM, 0.322	1
37	XBHZZ	78500	2203H6950	.SHIM, 0.323	1
37	XBHZZ	78500	2203J6952	.SHIM, 0.324	1
37	XBHZZ	78500	2203K6953	.SHIM, 0.325	1
37	XBHZZ	78500	2203L6954	.SHIM, 0.326	1
37	XBHZZ	78500	2203M6955	.SHIM, 0.327	1
37	XBHZZ	78500	2203N6956	.SHIM, 0.328	1
37	XBHZZ	78500	2203P6958	.SHIM, 0.329	1
37	XBHZZ	78500	2203Q6959	.SHIM, 0.330	1
37	XBHZZ	78500	2203R6960	.SHIM, 0.331	1
37	XBHZZ	78500	2203S6961	.SHIM, 0.332	1
37	XBHZZ	78500	2203T6962	.SHIM, 0.333	1
37	XBHZZ	78500	2203U6963	.SHIM, 0.334	1
37	XBHZZ	78500	2203V6964	.SHIM, 0.335	1
37	XBHZZ	78500	2203W6965	.SHIM, 0.336	1
37	XBHZZ	78500	2203X6966	.SHIM, 0.337	1
37	XBHZZ	78500	2203Y6967	.SHIM, 0.338	1
37	XBHZZ	78500	2203Y6968	.SHIM, 0.339	1
37	XBHZZ	78500	2203G6923	.SHIM, 0.153	2
37	XBHZZ	78500	2203H6924	.SHIM, 0.154	2
37	XBHZZ	78500	2203J6926	.SHIM, 0.155	2
37	XBHZZ	78500	2203K6927	.SHIM, 0.156	2
37	XBHZZ	78500	2203L6928	.SHIM, 0.157	2
37	XBHZZ	78500	2203M6929	.SHIM, 0.158	2
37	XBHZZ	78500	2203N6930	.SHIM, 0.164	2
37	XBHZZ	78500	203P6932	.SHIM, 0.170	2
37	XBHZZ	78500	2203Q6933	..SHIM,0.176	2
37	XBHZZ	78500	2203R6934	.SHIM, 0.182	2
38	XBHHH	78500	A2-3226E655	.CAGE ASSEMBLY, PINION	1
39	XBHZZ	78500	A3226E655	..CAGE, ASSEMBLY, PINION	1
40	XBHZZ	78500	3226E655	...CAGE, PINION	1
41	PAHZZ	78500	44348	..CUP,TAPERED ROLLER	1
42	PAHZZ	78500	HM803110	..CUP,TAPERED ROLLER	1
43	PAHZZ	78500	44143	.CONE AND ROLLERS,TA OUTER	1
44	PAHZZ	60038	HM-803146	.CONE AND ROLLERS,TA INNER	1
45	XBHHH	78500	436169	.PINION ASSEMBLY	1
46	XBHZZ	78500	36169	..PINION, BEVEL	1
47	PAHZZ	78500	1228H268	..BEARING,ROLLER,CYLI	1
48	PAHZZ	78500	1229W1167	..RING,RETAINING	1
49	PAHZZ	78500	JM511910	CUP,TAPERED ROLLER	2
50	PAHZZ	78500	2214E57	RING,EXTERNALLY THR ADJUSTING	2
51	PAHZZ	78500	1199R2176	PIN,COTTER	2
52	PAHZZ	89345	9409949	PLUG,PIPE	1

END OF FIGURE

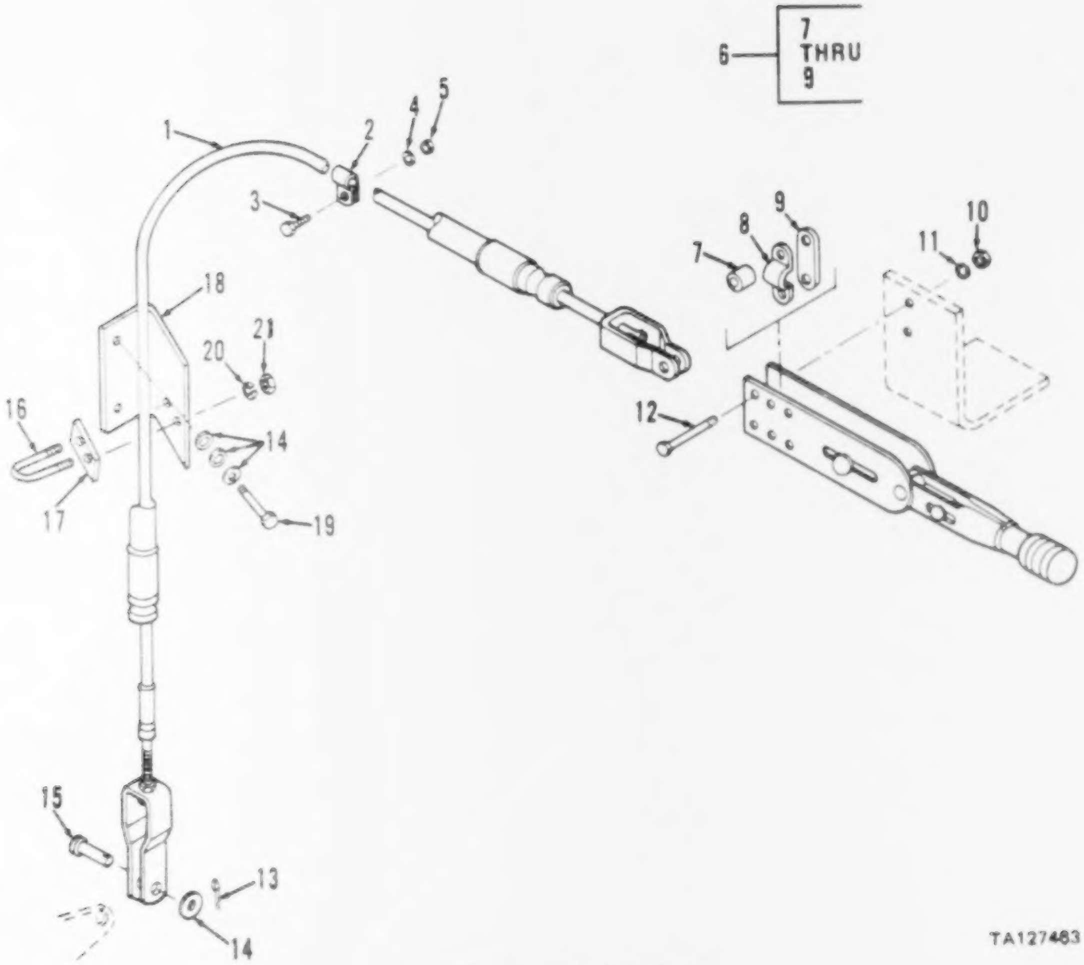
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Figure 67. Parking brake linkage.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 12 BRAKES	
				GROUP 1201 HAND BRAKES	
				FIG. 67 PARKING BRAKE LINKAGE	
1	PAOZZ	92867	X10733	CABLE ASSY,PARKING BRAKE	1
2	PAOZZ	75272	CCV-0917	CLAMP,LOOP	1
3	PAOZZ	96906	MS18154-113	SCREW,CAP,HEXAGON H	1
4	PAOZZ	96906	MS35338-48	WASHER,LOCK	1
5	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON	1
6	PAOZZ	92867	01197900	LEVER,MANUAL CONTRO	1
7	XBOZZ	92687	81000-343	.SPACER, LEVER	2
8	PAOZZ	92867	81-000108	.STRAP,RETAINING	1
9	XBOZZ	92687	81000-131	.SPACER, CLAMP	1
10	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	2
11	PAOZZ	96906	MS35338-45	WASHER,LOCK	2
12	PAOZZ	10988	13-536	BOLT,MACHINE	1
13	PAOZZ	96906	MS24665-283	PIN,COTTER	1
14	PAOZZ	96906	MS27183-15	WASHER,FLAT	7
15	PAOZZ	96906	MS35810-4	PIN,STRAIGHT,HEADED	1
16	PAOZZ	10988	0756-BL	BOLT,U	1
17	XBOZZ	10988	L49736	SPACER U-BOLT	1
18	XBOZZ	10988	L102899	BRACKET, PARKING BRAKE	1
19	PAOZZ	96906	MS90725-90	SCREW,CAP,HEXAGON H	2
20	PAOZZ	96906	MS35338-45	WASHER,LOCK	2
21	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	2

END OF FIGURE

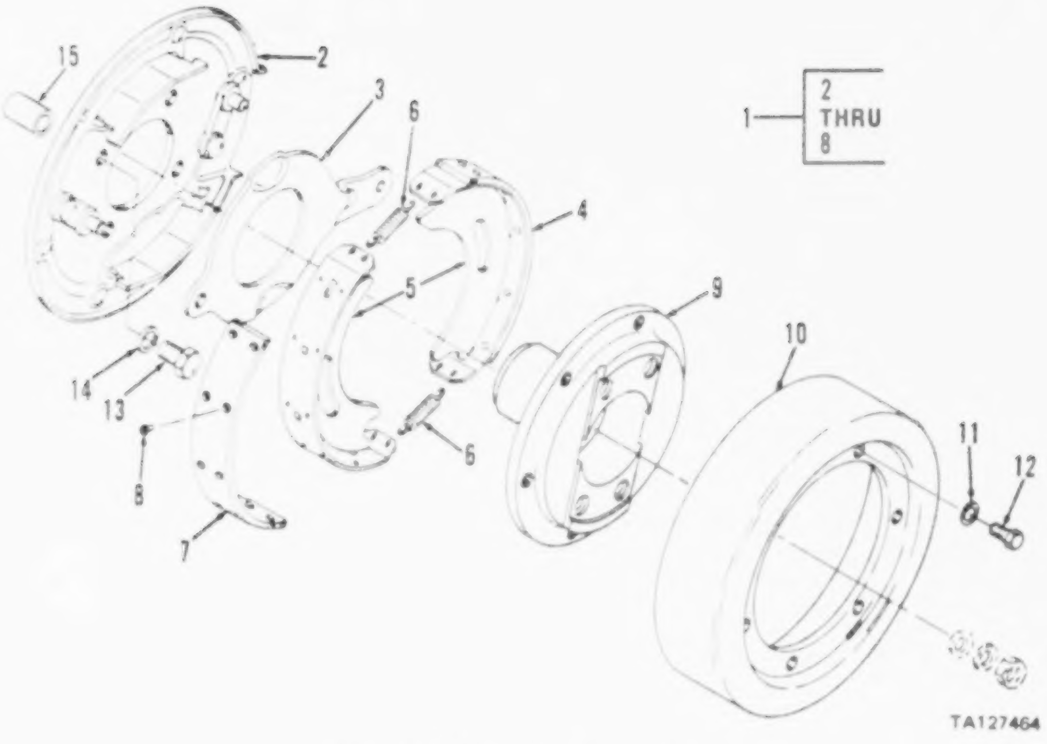
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Figure 68. Parking brake assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1201 HAND BRAKES	
				FIG. 68 PARKING BRAKE ASSEMBLY	
1	PAOOO	12603	230863	BRAKE,SHOE TYPE......................	1
2	XBOZZ	12603	801715	.BACKING PLATE.......................	1
3	PFOZZ	78500	372-D-290	.LEVER,REMOTE........................	1
4	PFOFF	12603	801685	.BRAKE SHOE LINING...................	1
5	XAOZZ	12603	NSS	.BRAKE SHOE..........................	1
6	PAOZZ	83299	1060371	.SPRING,HELICAL,EXTE.................	2
7	PAFZZ	12603	801214	.BRAKE LINING KIT....................	1
8	XAFZZ	12603	23H-504	..RIVET,TUBULAR......................	20
9	PBOZZ	12603	230864	PLATE,BACKING,BP.....................	1
10	PAOZZ	12603	215160	BRAKE DRUM...........................	1
11	PAOZZ	12603	23E06	WASHER,LOCK..........................	1
12	PAOZZ	96906	MS90727-58	SCREW,CAP,HEXAGON H..................	6
13	PAOZZ	96906	MS90725-138	SCREW,CAP,HEXAGON H..................	4
14	PAOZZ	12603	5E-09	WASHER,LOCK..........................	4
15	XBOZZ	12603	237035	SPACER...............................	4

END OF FIGURE

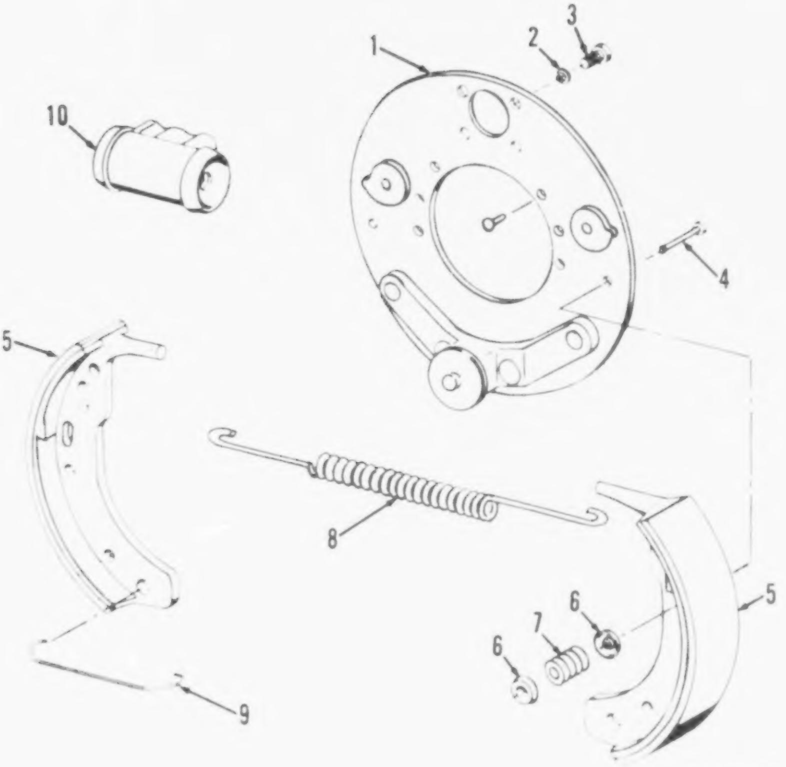
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Figure 69. Service brakes.

GROUP 1202 SERVICE BRAKES

FIG. 69 SERVICE BRAKES

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PFOZZ	78500	A-3236-E-1669-S	.PLATE,BACKING,BRAKE BACKING.......	1
2	PAOZZ	96906	MS35338-46	.WASHER,LOCK..........................	2
3	PAOZZ	96906	MS18154-59	.SCREW,CAP,HEXAGON H................	2
4	PAOZZ	78500	1779W49	.PIN,STRAIGHT,HEADED PART OF KIT P/N KIT9112............................	2
5	KFOZZ	78500	NSS	.SHOE LINING ASSEMBLY PART OF KIT P/N KIT9112..........................	2
6	PAOZZ	78500	1807A1	.SEAT,HELICAL COMPRE PART OF KIT P/N KIT9112............................	4
7	PAOZZ	78500	2858M91	.SPRING,HELICAL,COMP PART OF KIT P/N KIT9112............................	2
8	PAOZZ	78500	2758R18	.SPRING,HELICAL,EXTE................	1
9	PAOZZ	78500	1718D108	.CLIP,RETAINING PART OF KIT P/N KIT9112..............................	1
10	PAOZZ	63477	FD21083	CYLINDER ASSEMBLY,H.................	1

END OF FIGURE

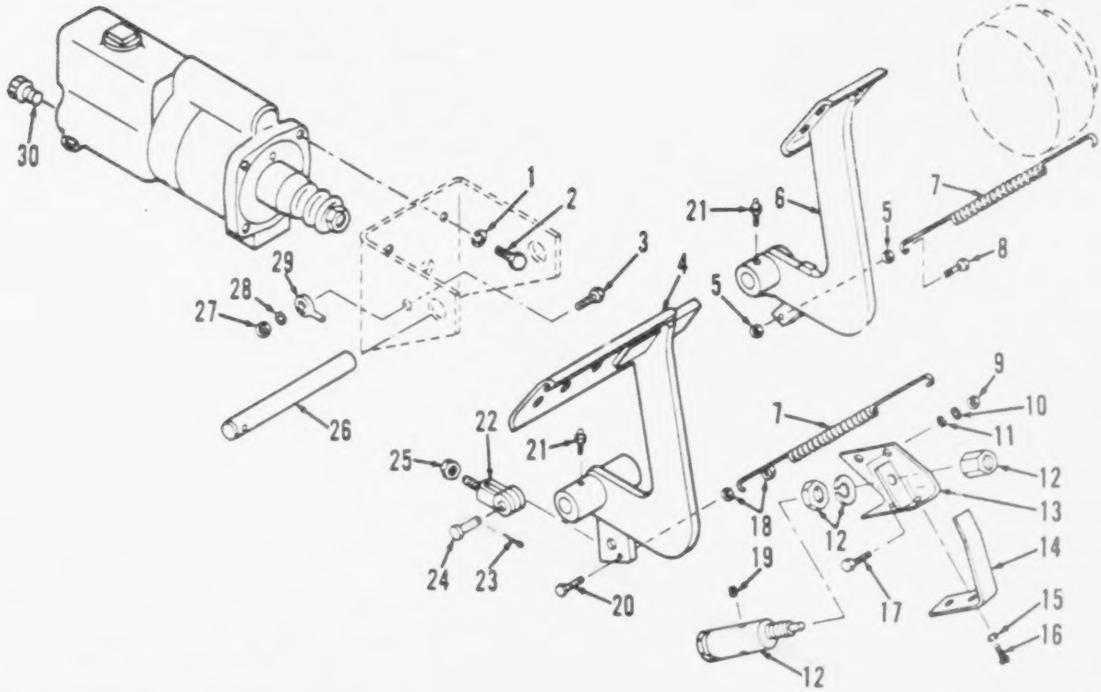
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Figure 70. Service brake pedal and declutch pedal.

GROUP 1204 HYDRAULIC BRAKE ASSEMBLY

FIG. 70 SERVICE BRAKE PEDAL AND DECLUTCH PEDAL

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	96906	MS35338-47	WASHER,LOCK	4
2	PAOZZ	96906	MS90728-86	SCREW,CAP,HEXAGON H	4
3	PAOZZ	96906	MS90725-8	SCREW,CAP,HEXAGON H	1
4	XBOZZ	10988	L101690	PEDAL, SERVICE BRAKE	1
5	PAOZZ	96906	MS35691-5	NUT,PLAIN,HEXAGON	2
6	XBOZZ	10988	L101689	PEDAL, DECLUTCH	1
7	PAOZZ	10988	L103442	SPRING,HELICAL,EXTE RETURN	2
8	PAOZZ	96906	MS90725-8	SCREW,CAP,HEXAGON H	1
9	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	2
10	PAOZZ	96906	MS27183-13	WASHER,FLAT	2
11	PAOZZ	96906	MS35338-45	WASHER,LOCK	2
12	PAOZZ	92865	03-640-195A	VALVE,DECLUTCH	1
13	XBOZZ	10988	L103638	BRACKET, MOUNTING	1
14	PAOZZ	10988	L101567	SPRING,FLAT	1
15	PAOZZ	96906	MS35338-43	WASHER,LOCK	2
16	PAOZZ	96906	MS51957-63	SCREW,MACHINE	2
17	PAOZZ	96906	MS90725-34	BOLT,MACHINE	2
18	PAFZZ	96906	MS35691-5	NUT,PLAIN,HEXAGON	2
19	PAOZZ	76197	9112001	PLUG,PIPE	1
20	PAOZZ	96906	MS90725-10	SCREW,CAP,HEXAGON H	1
21	PAOZZ	96906	MS15003-4	FITTING,LUBRICATION	2
22	PAOZZ	10988	A56132	CLEVIS,ROD END	1
23	PAOZZ	96906	MS24665-351	PIN,COTTER	1
24	PAOZZ	96906	MS35810-6	PIN,STRAIGHT,HEADED	1
25	PAOZZ	96906	MS35691-37	NUT,PLAIN,HEXAGON	1
26	PAOZZ	10988	L76372	PIN,STRAIGHT HE	1
27	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON	1
28	PAOZZ	96906	MS35338-44	WASHER,LOCK	1
29	PAOZZ	10988	213-23	CONNECTOR,ROD END	1
30	PAOZZ	13445	8629	SWITCH,PRESSURE	1

END OF FIGURE

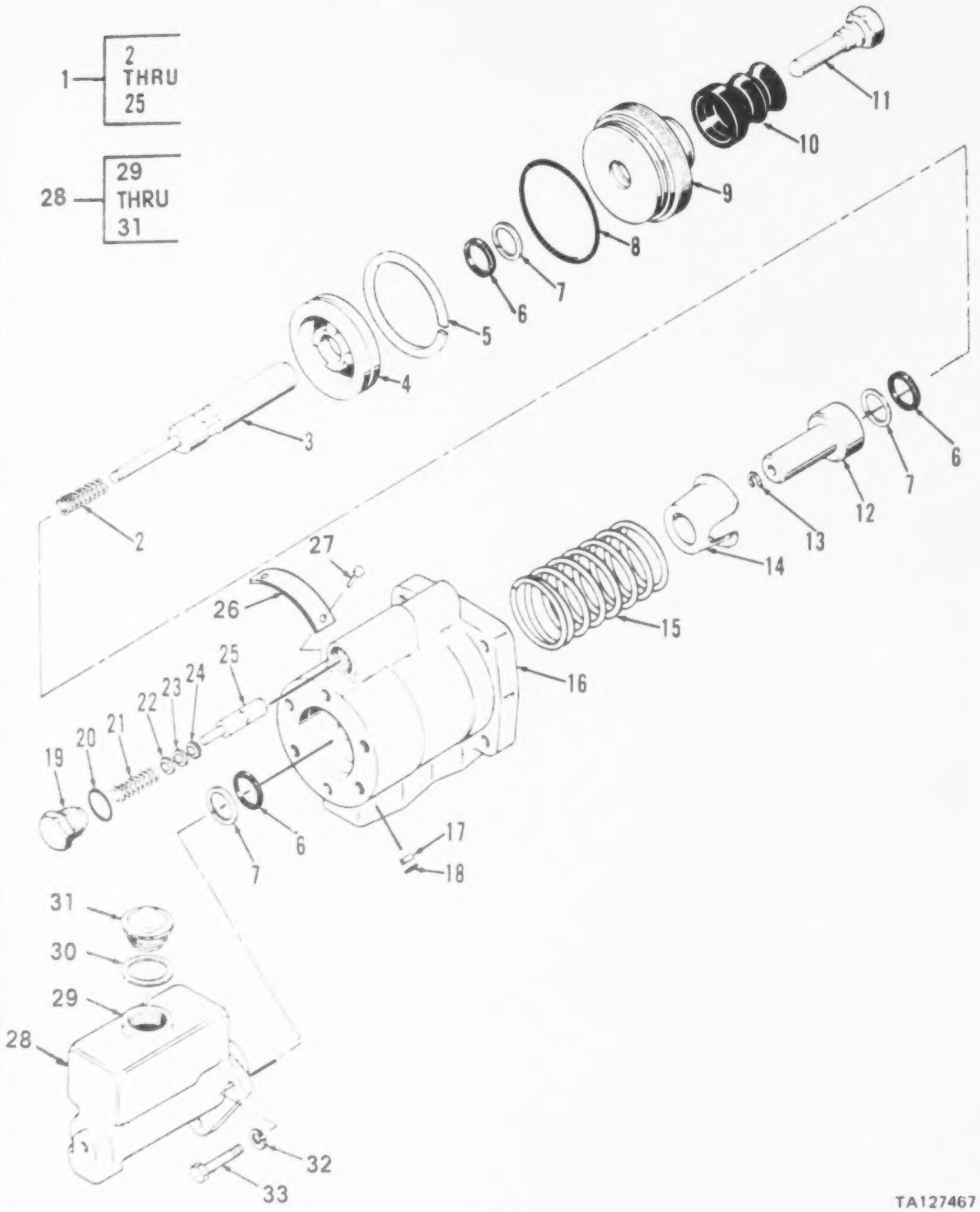
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Figure 71. Service brake hydraulic brake valve.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1204 HYDRAULIC BRAKE SYSTEM	
				FIG. 71 SERVICE BRAKE HYDRAULIC BRAKE VALVE	
	PAOFF	92865	02-460-334	CYLINDER ASSEMBLY,	1
1	XAOFF	92865	20-100-065	.CHAMBER, OIL NHA NSN 2530-01-K25-9778	1
2	XBFZZ	92865	X2140-5	..SPRING, INNER	1
3	XBFZZ	92865	30-010-302	..PISTON, INNER	1
4	XBFZZ	92865	30-010-304	..PISTON	1
5	KFFZZ	92865	B125417	..RING, PISTON PART OF KIT P/N 02-400-076	1
6	KFFZZ	92865	X2140-3	..SEAL, PART OF KIT P/N 02-400-076	3
7	KFFZZ	92865	X2140-4	..RING, BACK-UP, PART OF KIT P/N 02-400-076	3
8	KFFZZ	92865	32-630-235	..O-RING PART OF KIT P/N 02-400-076	1
9	XBFZZ	92865	X2140-1	..END PLUG, COVER	1
10	PAOZZ	92865	32-570-005	..BOOT,DUST AND MOIST PART OF KIT P/N 02-400-076	1
11	XBFZZ	92865	30-020-107	..ROD, PUSH	1
12	XBFZZ	92865	X2140-6	..ROD, ACTUATOR	1
13	KFFZZ	92865	32-640-050	..RING, RETAINING, PART OF KIT P/N 02-400-076	1
14	PAFZZ	92865	X2140-2	..CAP,PROTECTIVE,DUST	1
15	XBFZZ	92865	32-660-164	..SPRING, OUTER	1
16	XAFZZ	92865	30-100-336	..HOUSING	1
17	XBFZZ	92865	32-330-007	..PLUG	1
18	XBFZZ	92865	32-640-052	..RING, RETAINING	1
19	XBFZZ	92865	30-030-153	..PLUG, END	1
20	KFFZZ	92865	32-630-108	..O-RING PART OF KIT P/N 02-400-076	1
21	XBFZZ	92865	32-660-204	..SPRING	1
22	XBFZZ	92865	32-390-013	..SHIM	V
23	XBFZZ	92865	32-390-012	..SHIM	V
24	XBFZZ	92865	32-390-011	..SHIM	V
25	XBFZZ	92865	X-1751-1	..PISTON	1
26	XBFZZ	92865	32-830-124	.LABEL	1
27	PAOZZ	92865	33-200-001	.SCREW,DRIVE	2
28	PAOZZ	92865	20-100-180	CYLINDER ASSEMBLY	1
29	XAFZZ	92865	30-100-292	..HOUSING	1
30	PAOZZ	92865	33-115-017	..GASKET	1
31	PAOZZ	92865	28-030-002	..CAP,FILLER OPENING	1
32	PAOZZ	96906	MS35338-46	.WASHER,LOCK	3
33	PAOZZ	96906	MS90725-62	.SCREW,CAP,HEXAGON H	3

END OF FIGURE

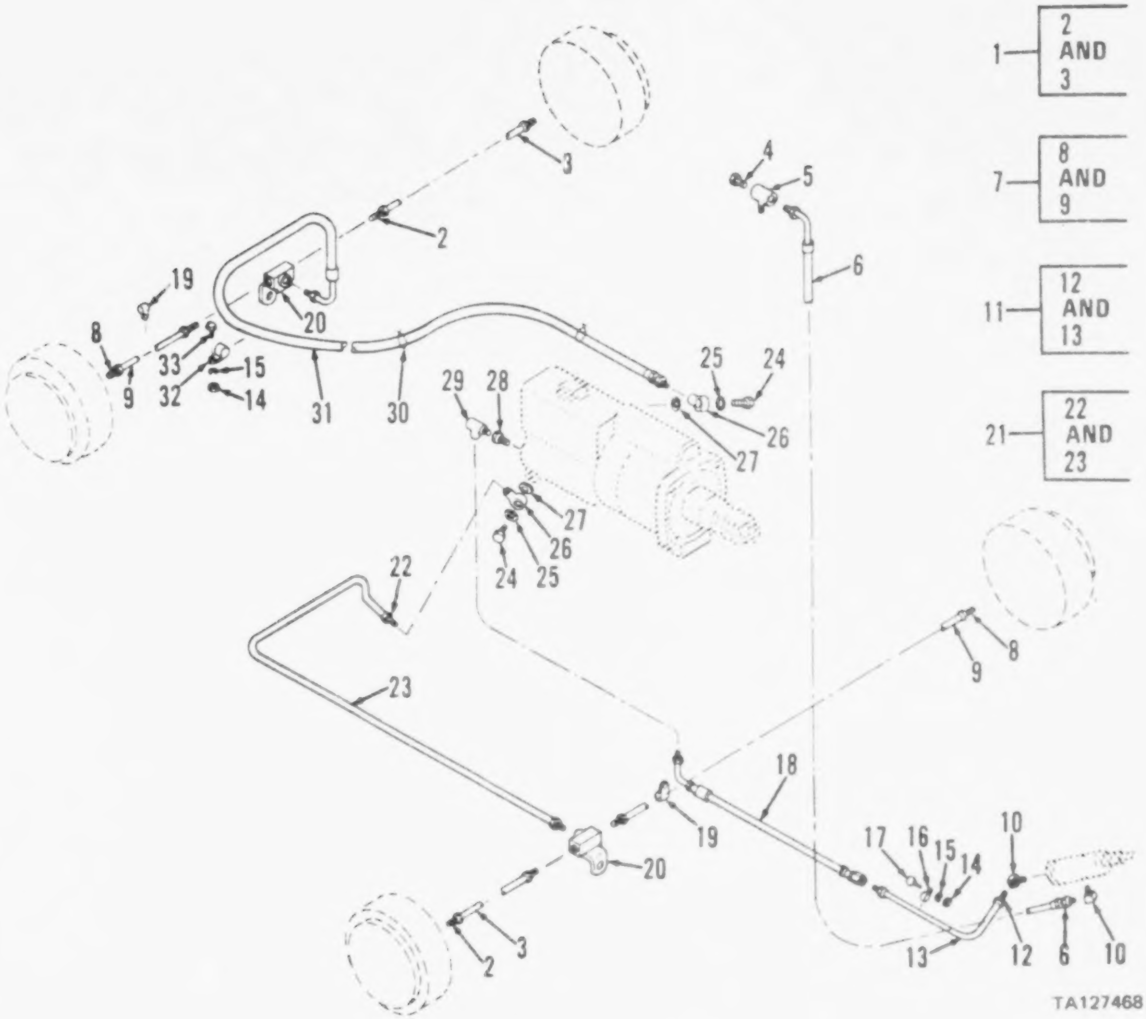
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Figure 72. Service brake lines.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1204 HYDRAULIC BRAKE SYSTEM	
				FIG. 72 SERVICE BRAKE LINES	
1	PBOZZ	10988	L103209	TUBE,ASSEMBLY,MET BRAKE, SUPPLY....	2
2	XAOZZ	10988	222-1002	.FITTING, TUBE........................	2
3	XAOZZ	10988	L103208	.TUBE.................................	1
4	PAOZZ	10988	222-1062	PLUG,TUBE FITTING.....................	1
5	PAOZZ	10988	222-1071	TEE,PIPE TO TU........................	1
6	PAFZZ	10988	L103663	HOSE ASSEMBLY,NONME DECLUTCH VALVE, OUT................................	1
7	PBOZZ	10988	L103211	TUBE ASSEMBLY,MET BRAKE SUPPLY.....	2
8	XAOZZ	10988	222-1002	.FITTING, TUBE........................	2
9	PAOZZ	10988	L103211	.TUBE ASSEMBLY,METAL..................	1
10	PAOZZ	10988	222-1022	ELBOW,PIPE TO TUBE FLARE............	2
11	PBOZZ	10988	L103203	TUBE ASSEMBLY,MET DECLUTCH INLET...	1
12	XAOZZ	10988	222-1002	.FITTING, TUBE, 7/16-24.............	2
13	XAOZZ	10988	L103202	.TUBE.................................	1
14	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON.....................	3
15	PAOZZ	96906	MS35338-46	WASHER,LOCK...........................	3
16	PAFZZ	10988	49851	CLAMP,LOOP............................	2
17	PAOZZ	96906	MS18154-58	SCREW,CAP,HEXAGON H..................	
18	PAOZZ	10988	L103200	HOSE ASSEMBLY,NONME DECLUTCH VALVE, INLET..............................	1
19	PAFZZ	10988	49832	CLAMP,LOOP............................	1
20	PAOZZ	10988	L76365	TEE,TUBE STRAP........................	2
21	PBOZZ	10988	L103207	TUBE ASSEMBLY,MET FRONT BRAKE......	1
22	XAOZZ	10988	222-1002	.FITTING, TUBE,.......................	2
23	XAOZZ	10988	L103206	.TUBE.................................	1
24	PAOZZ	10988	A12864	BOLT,FLUID PASSAGE CONNECTION......	2
25	PAOZZ	63477	FC602F	GASKET CONNECTION..................	2
26	PAOZZ	10988	A18531	FITTING,BRAKE EL....................	2
27	PAOZZ	63477	FC603F	WASHER,FLAT CONNECTION.............	2
28	PAOZZ	10988	222-1012	ADAPTER,STRAIGHT,PI...................	1
29	PAOZZ	10988	217-1061	TEE,PIPE..............................	1
30	PAOZZ	06383	SST2I-CO	STRAP,TIEDOWN,ELECT...................	9
31	PAOZZ	10988	L-78472	HOSE ASSEMBLY,NONME BRAKE..........	1
32	PAOZZ	75272	COV0913	CLAMP,LOOP............................	1
33	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	1

END OF FIGURE

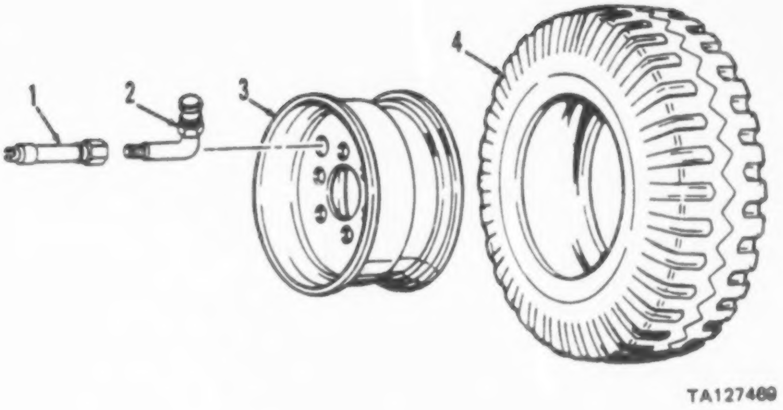
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Figure 73. Wheels and tires.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 13 WHEELS AND TRACKS	
				GROUP 1311 WHEEL ASSEMBLY	
				FIG. 73 WHEELS AND TIRES	
1	PAOZZ	17875	331	VALVE EXTENSION,TIR..................	4
2	PAOZZ	17875	VS-900-572C-03	VALVE,AIR,PRESSURE...................	4
3	PAOZZ	10988	L-112956	WHEEL,PNEUMATIC TIR..................	4
4	PAOZZ	81348	ZZ-T-381/15-19.5 /GP3A/D/TBND	TIRE,PNEUMATIC.......................	4

END OF FIGURE

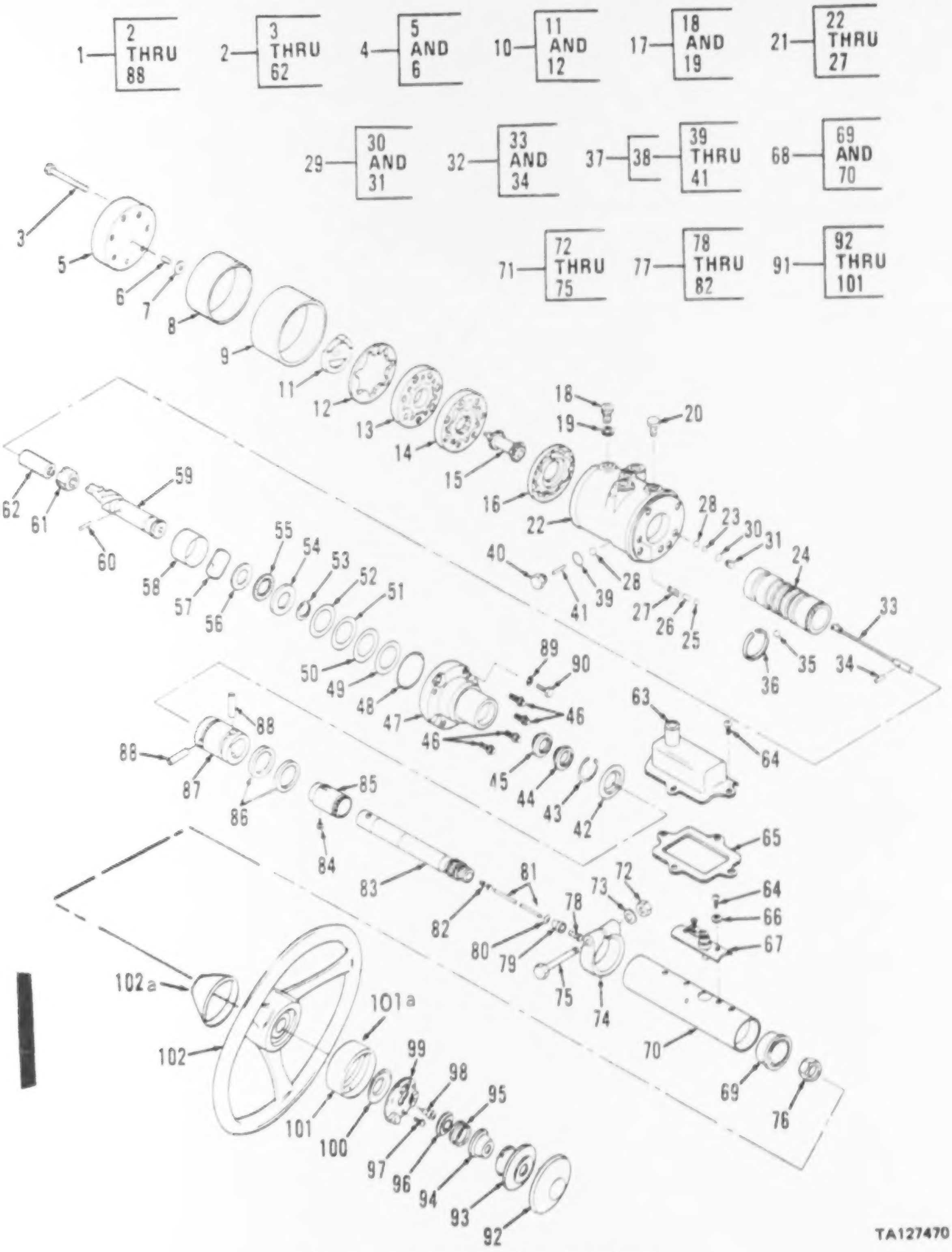
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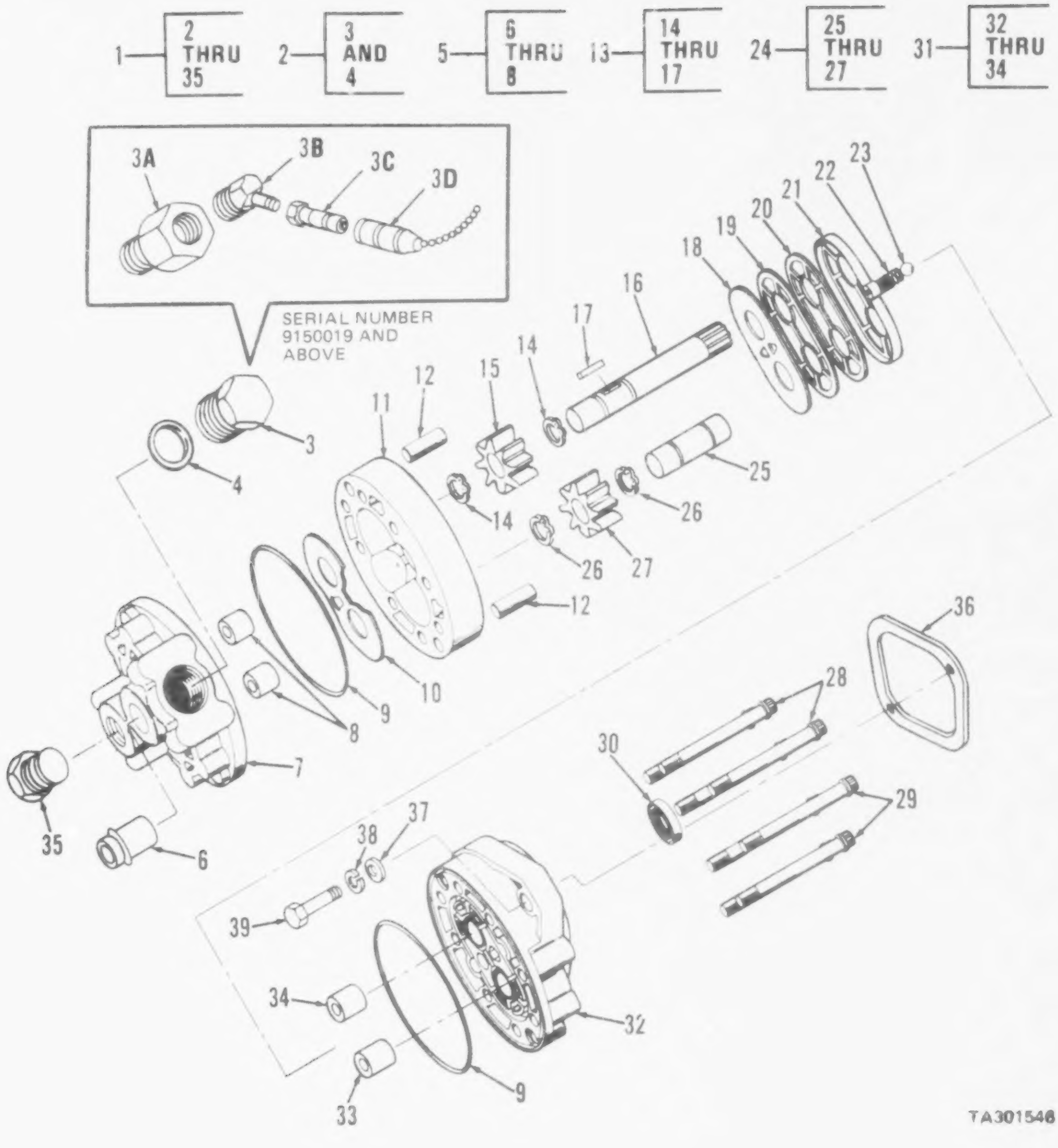
Figure 74. Steering gear and steering column.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 14 STEERING	
				GROUP 1407 POWER STEERING GEAR ASSEMBLY	
				FIG. 74 STEERING GEAR AND STEERING COLUMN	
1	P ZZ	77640	HGA28015-A1-1050	STEERING GEAR	1
2	FF	77640	K67292	.HYDRAGUIDE UNIT	1
3	PAFZZ	77640	021296	..SCREW,CAP,HEXAGON H	7
4	XAFZZ	77640	402803-A1	..COVER ASSEMBLY, END	1
5	XAFZZ	77640	402803	...COVER, END	1
6	XAFZZ	77640	040111	...ROLLER, NEEDLE	1
7	PAFZZ	04994	028395	..WASHER	1
8	XAFZZ	77640	099077	..SEAL,PLAIN	1
9	PAFZZ	77640	032621	..SEAL,SPECIAL	1
10	PAFZZ	04994	HGA014000-A1	..COMMUTATOR ASSEMBLY ASSEMBLY	1
11	XAFZZ	77640	HGA014000	...COMMUTATOR	1
12	XAFZZ	77640	HGA018001	...RING, COMMUTATOR	1
13	XAFZZ	77640	HGA015001	..MANIFOLD	1
14	PAFZZ	77640	HGA287005	..ROTOR ASSEMBLY	1
15	XAFZZ	77640	HGA013006	..LINK, DRIVE	1
16	XAFZZ	77640	477235	..SPACER	1
17	PAFZZ	77640	415554-A1	..PLUG,MACHINE THREAD ASSEMBLY	1
18	XAFZZ	77640	K68108	...PLUG	1
19	PAFZZ	77640	032229	...PACKING,PREFORMED	1
20	XAFZZ	77640	036138	..PLUG	5
21	XAFZZ	77640	K68112	..HOUSING ASSEMBLY	1
22	XAFZZ	77640	HGA012014	...HOUSING	1
23	XAFZZ	96906	MS19059-87	...BALL	1
24	XAFZZ	77640	K68107	...SPOOL, VALVE	1
25	XAFZZ	96906	MS19059-89	...BEARING,BALL TAPERE	1
26	PAFZZ	77640	040113	...BEARING,ROLLER,NEED	2
27	PAFZZ	77640	401358	...SPRING,HELICAL,COMP	2
28	PAFZZ	96906	MS19059-2414	..BALL,BEARING	2
29	PAFZZ	77640	036147-A1	..PLUG ASSEMBLY,STEER ASSEMBLY	2
30	PAFZZ	04994	032498-1	...PACKING,PREFORMED	2
31	XAFZZ	77640	036147	...PLUG	2
32	XAFZZ	77640	401360-A1-538	..TORSION BAR ASSEMBLY	1
33	XAFZZ	77640	401360	...BLANK, TORSION BAR	1
34	PAFZZ	80657	G-403-Q	...PIN,STRAIGHT,HEADLE	1
35	PAFZZ	96906	MS19059-2416	..BALL,BEARING	1
36	PAFZZ	04994	401362	..SPRING,FLAT	1
37	XDFZZ	77640	415395-A2	..PLUG,MACHINE THREAD ASSEMBLY	
38	XAFZZ	77640	415395-A1	...PLUG & O-RING ASSEMBLY	1
39	PAFZZ	77640	032305	....PACKING,PREFORMED	1
40	XAFZZ	77640	415395	....PLUG, O-RING BOSS	1
41	XAFZZ	77640	040070	...PIN,SPRING	1
42	PAFZZ	04994	032535	..SEAL,SPECIAL	1
43	PAFZZ	77640	401233	..RING,RETAINING	1
44	PAFZZ	77640	028415	..WASHER,SHOULDERED A	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
45	PAFZZ	77640	032356	..SEAL,PLAIN	1
46	PAFZZ	10988	166-24	..BOLT,MACHINE	4
47	XAFZZ	77640	HGA016002	..COVER, UPPER	1
48	PAFZZ	04994	032430	..PACKING,PREFORMED	1
49	XAFZZ	77640	033160	..SHIM, HYDRAGUIDES	V
50	XAFZZ	77640	033159	..SHIM, HYDRAGUIDES	V
51	XAFZZ	77640	033158	..SHIM, HYDRAGUIDES	V
52	XAFZZ	77640	033157	..SHIM, HYDRAGUIDES	V
53	PAFZZ	77640	401367	..RING,RETAINING	1
54	PAFZZ	77640	400075	..BEARING,WASHER,THRU	1
55	PAFZZ	77640	063979	..RETAINER AND ROLLER	1
56	PAFZZ	77640	400100	..BEARING,WASHER,THRU	1
57	PAFZZ	04994	401366	..WASHER	1
58	XAFZZ	77640	477254	..SPACER	1
59	PAFZZ	04994	089181	..SHAFT,INPUT	1
60	PAFZZ	80657	G-403-3	..PIN,STRAIGHT,HEADLE	1
61	PAFZZ	30076	199169	..RING,DRIVE	1
62	XAFZZ	77640	477248-209	..SPACER (DRIVE LINK)	1
63	PAFZZ	77640	402235-A1	.COVER ASSEMBLY,CONT AND CABLE ASSEMBLY	1
64	PAFZZ	77640	G420460	.SCREW SCREW ASSEMBLY	6
65	PAFZZ	77640	034031	.GASKET COVER	1
66	PAFZZ	96906	MS27183-41	.WASHER,FLAT	2
67	PAFZZ	77640	032156	.BRUSH,ELECTRICAL CO	1
68	PAFZZ	77640	096295-A1	.SLEEVE,COMPRESSION ASSEMBLY	1
69	XAFZZ	77640	063980	..BUSHING & RETAINER COLUMN ASSEMBLY	1
70	XAFZZ	77640	K67241	..TUBE, JACKET NHA PN-77640K67245..	1
71	XBFZZ	77640	475109-A1	.CLAMP,TUBE ASSEMBLY	1
72	PAFZZ	96906	MS51968-5	..NUT,PLAIN,HEXAGON	1
73	PAFZZ	96906	MS35333-41	..WASHER,LOCK	1
74	XAFZZ	77640	475109	..CLAMP,LOOP	1
75	PAFZZ	96906	MS90726-41	..BOLT,MACHINE	1
76	PAFZZ	77640	026045	.NUT,PLAIN,HEXAGON	1
77	PAFZZ	10988	N6344	.LEAD,ELECTRICAL ASSEMBLY	1
78	PAFZZ	77640	032089	..TERMINAL,STUD	1
79	PAFZZ	77640	051036	..INSULATOR,BUSHING	1
80	PAFZZ	10988	T30271-1	..PACKING,PREFORMED	1
81	XBFZZ	77640	451987	..CABLE, HORN, #16	1
82	PAFZZ	73740	032262	..TERMINAL,QUICK DISC	1
83	PFFZZ	77640	K67242	.TUBE,WHEEL,STEERING	1
84	PAFZZ	77640	020168	.SCREW,MACHINE	1
85	PAFZZ	77640	063024	.RING ASSEMBLY,ELECT ASSEMBLY	1
86	PAFZZ	04994	401362	.SPRING,FLAT	2
87	XAFZZ	77640	K67240	.COUPLING	1
88	XDFZZ	77640	040050	.PIN,STRAIGHT,HEADLE	2
89	PAFZZ	96906	MS35338-45	WASHER,LOCK	4
90	PAFZZ	96906	MS90725-31	BOLT,MACHINE	4
91	PAOZZ	77640	465379	PARTS KIT,HORN BUTT HORN	1
92	PAOZZ	19207	11677308	.PARTS KIT,HORN BUTT	1
93	PAOZZ	77640	450029	.PARTS KIT,HORN BUTT	1
94	PAOZZ	77640	029031	.CONTACT,ELECTRICAL	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
95	PAOZZ	77640	401081	.SPRING,HELICAL,COMP..................	1
96	PAOZZ	77640	401082	.SPRING,HELICAL,COMP..................	1
97	PAOZZ	16764	1985348	.SEMICONDUCTOR DEVIC..................	3
98	PAOZZ	77640	051036	.INSULATOR,BUSHING....................	1
99	XAOZZ	77640	454895	.PLATE ASSEMBLY.......................	1
100	PAFZZ	77640	029039	.WASHER,SHOULDERED A..................	1
101	PAOZZ	51002	55-292-00	UPPER HUB COVER.......................	1
101A	PAFZZ	77640	029037	CONTACT,ELECTRICAL....................	1
102	PAFZZ	51002	7404900	WHEEL,STEERING........................	1
102A	PAOZZ	51002	55-294-00	LOWER HUB COVER.......................	1

END OF FIGURE


1 — 2 THRU 35
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5 — 6 THRU 8
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24 — 25 THRU 27
31 — 32 THRU 34
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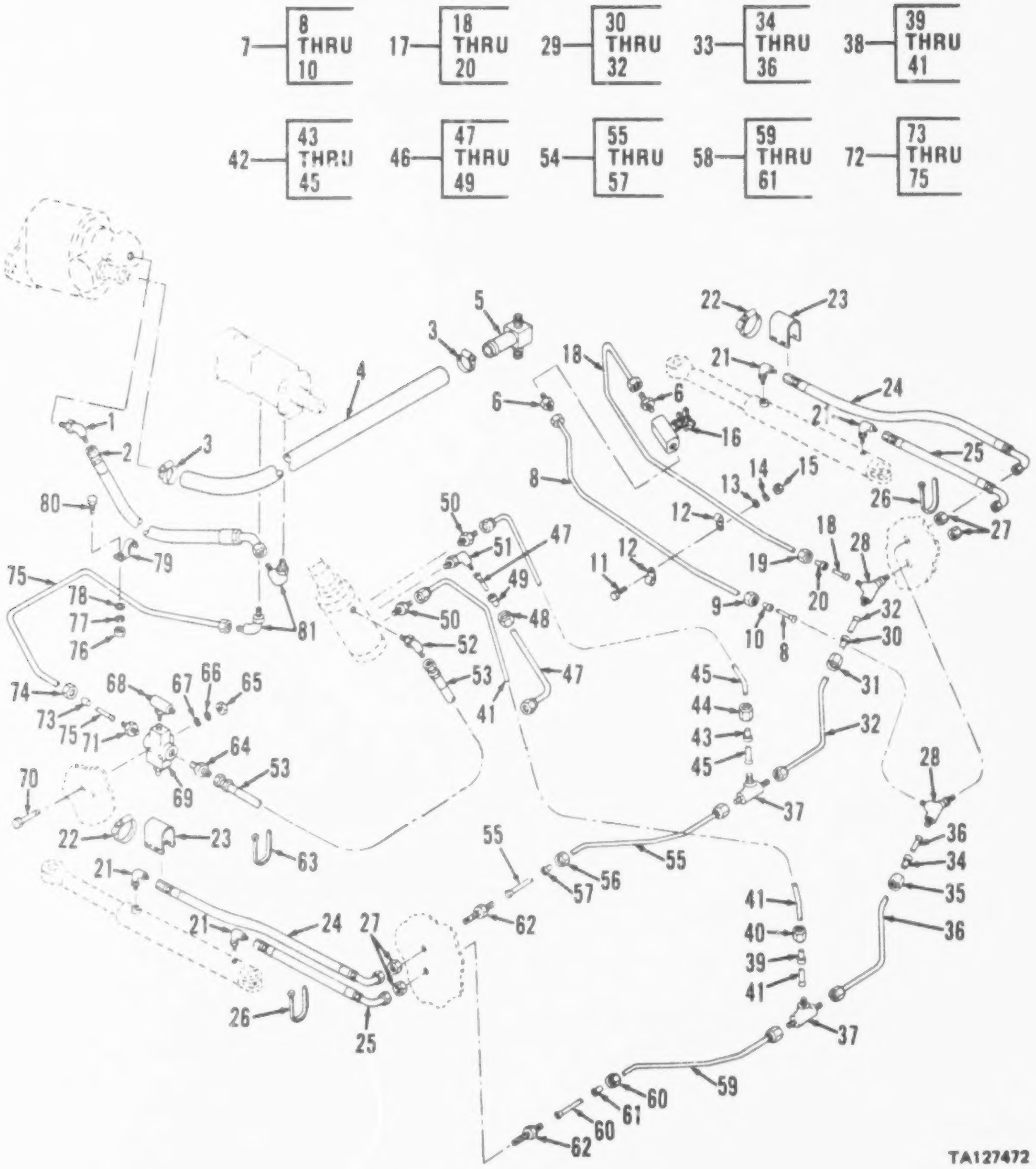
Figure 75. Hydraulic pump and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1410 HYDRAULIC PUMP OR FLUID MOTOR ASSEMBLY	
				FIG. 75 HYDRAULIC PUMP AND MOUNTING	
1	PAOZZ	10988	L101605	PUMP,ROTARY...........................	1
2	PAFZZ	10988	218-5158	.PLUG,MACHINE THREAD.................	1
3	XAFZZ	27007	16103-12	..PLUG................................	1
3A	PAOZZ	10988	218-5094	ADAPTER,STRAIGHT......................	1
3B	PAOZZ	10988	L100960	ELBOW,PIPE............................	1
3C	PAOZZ	73992	2K16	COUPLING HALF,QUICK...................	1
3D	PAOZZ	08752	H2-66-231	CAP,QUICK,DISCONNEC...................	1
4	KFFZZ	27007	16133-12	..O-RING, PART OF KIT PART OF KIT P/N 24500-930..........................	1
5	XAFZZ	27007	24500-142	.BACKPLATE ASSEMBLY...................	1
6	XAFZZ	27007	24500-63S	..TUBE, INTAKE........................	1
7	XAFZZ	27007	24500-126C	..BACKPLATE, CASTING..................	1
8	XAFZZ	27007	20100-3	..BUSHING.............................	2
9	PAFZZ	27007	16015-59-90	.PACKING,PREFORMED PART OF KIT P/N 24500-930............................	2
10	KFFZZ	27007	24500-643	.PLATE,THRUST PART OF KIT P/N 24500-930................................	1
11	XAFZZ	27007	24501-250	.BODY.................................	1
12	XBFZZ	27007	16028-716	.PIN, DOWEL...........................	2
13	PAFZZ	27007	24501-315	.GEARSHAFT,HELICAL-S DRIVE..........	1
14	XAFZZ	27007	20100-8	..RING, RETAINING.....................	2
15	XAFZZ	27007	24501-251	..GEAR................................	1
16	XAFZZ	27007	24501-314	..SHAFT, DRIVE........................	1
17	XAFZZ	27007	24500-612	..KEY.................................	1
18	KFFZZ	27007	24500-653	.DIAPHRAGM, PART OF PART OF KIT P/N 24500-930............................	1
19	KFFZZ	27007	20100-6	.GASKET, BACK-UP PART OF KIT P/N 24500-930............................	1
20	PAFZZ	27007	24500-636	.GASKET PART OF KIT P/N 24500-930...	1
21	KFFZZ	27007	24500-600	.SEAL, DIAPHRAGM, PART OF KIT P/N 24500-930............................	1
22	KFFZZ	27007	15471-28	.SPRING,HELICAL,COMP PART OF KIT P/N 24500-930...........................	2
23	XDFZZ	27007	16006-13	.BALL,BEARING PART OF KIT P/N 24500-930................................	2
24	PAFZZ	27007	24501-301	.GEARSHAFT,BEVEL IDLER.............	1
25	XAFZZ	27007	20104-5	..IDLER, SHAFT........................	1
26	XAFZZ	27007	20100-8	..RING, RETAINING.....................	2
27	XAFZZ	27007	24501-251	..GEAR................................	1
28	PAFZZ	10988	166-53	.SCREW,CAP,HEXAGON H.................	4
29	PAFZZ	10988	166-51	.SCREW,CAP,HEXAGON...................	4
30	XDFZZ	27007	21070-85	.SEAL,PLAIN ENCASED PART OF KIT P/N 24500-930............................	1
31	PAFZZ	27007	24500524	.PLATE ASSEMBLY,FRON.................	1
32	XAFZZ	27007	24500-510C	..FRONTPLATE CASTING..................	1
33	XAFZZ	27007	20100-3	..BUSHING.............................	1
34	XAFZZ	27007	20100-2	..BUSHING.............................	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
35	PAFZZ	27007	16096-112	.PLUG,MACHINE THREAD................	1
36	PAOZZ	10988	L103397	GASKET PUMP.......................	1
37	PAOZZ	96906	MS27183-19	WASHER,FLAT.......................	2
38	PAOZZ	96906	MS35338-48	WASHER,LOCK.......................	2
39	PAOZZ	96906	MS90725-113	SCREW,CAP,HEXAGON H................	2

END OF FIGURE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29 30 THRU 32
33 34 THRU 36
38 39 THRU 41
42 43 THRU 45
46 47 THRU 49
54 55 THRU 57
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Figure 76. Hoses, lines and fittings.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1411 HOSES,LINES,FITTINGS	
				FIG. 76 HOSES,LINES AND FITTINGS	
1	PAOZZ	10988	218-5149	ELBOW,TUBE TO BOSS 45 DEGREES, PUMP TO SUPPLY HOSE	1
2	PAOZZ	10988	L103276	HOSE ASSY,NONMETALL SUPPLY	1
3	PAOZZ	96906	MS35842-12	CLAMP,HOSE	2
4	MOOZZ	24161	24VW	HOSE,NONMETALLIC MAKE FROM P/N 24VW	1
5	XBOZZ	99103	23916-20	ELBOW, BARB FITTING	1
6	XBOZZ	10988	L60497	NIPPLE,PIPE ORIFICE	2
7	XBOZZ	10988	L103603	TUBE ASSEMBLY, STEERING BYPASS	1
8	XAOZZ	10988	L103602	.TUBE	1
9	XBOZZ	10988	218-341	.NUT	2
10	XBOZZ	10988	218-361	.SLEEVE	2
11	PAOZZ	96906	MS90725-36	SCREW,CAP,HEXAGON H	1
12	PAOZZ	75272	COV-0513	CLAMP,LOOP	2
13	PAOZZ	96906	MS27183-13	WASHER,FLAT	1
14	PAOZZ	96906	MS35338-45	WASHER,LOCK	1
15	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	1
16	PAOZZ	24207	2001	VALVE,GLOBE BYPASS	1
17	XBOZZ	10988	L103601	TUBE ASSEMBLY, STEERING BYPASS	1
18	XAOZZ	10988	L103600	.TUBE	1
19	XBOZZ	10988	218-341	.NUT	2
20	XBOZZ	10988	218-361	.SLEEVE	2
21	PAOZZ	96906	MS51527A6	ELBOW,TUBE TO BOSS	4
22	PAOZZ	96906	MS35842-13	CLAMP,HOSE	4
23	XBOZZ	10988	L60520	GUARD, STEERING CYLINDER	2
24	PAOZZ	10988	L103755	HOSE ASSY,NONMETALL STEERING SUPPLY	2
25	PAOZZ	10988	L103754	HOSE ASSY,NONMETALL STEERING SUPPLY	2
26	PAOZZ	10988	L18331	STRAP,TIEDOWN,ELECT	2
27	XBOZZ	10988	218-1254	NUT,PLAIN,HEXAGON	4
28	PAOZZ	10988	L102863	TEE,TUBE BULKHEAD	2
29	XBOZZ	10988	L103253	TUBE ASSEMBLY, STEERING, TOP RIGHT	1
30	XBOZZ	10988	218-363	.SLEEVE	2
31	XBOZZ	10988	218-343	.NUT	2
32	XAOZZ	10988	L103252	.TUBE	1
33	XBOZZ	10988	L103251	TUBE ASSEMBLY, STEERING TOP LEFT	1
34	XBOZZ	10988	218-363	.SLEEVE	2
35	XBOZZ	10988	218-343	.NUT	2
36	XAOZZ	10988	L103250	.TUBE	1
37	XBOZZ	10988	218-1575	TEE, STEERING	2
38	XBOZZ	10988	L103227	TUBE ASSEMBLY STEERING SUPPLY	1
39	XBOZZ	10988	218-364	.SLEEVE	2
40	PAOZZ	10988	218-344	.NUT,TUBE COUPLING	2
41	XAOZZ	10988	L103226	.TUBE	1
42	XBOZZ	10988	L103225	TUBE ASSEMBLY STEERING SUPPLY	1
43	XBOZZ	10988	218-364	.SLEEVE	2
44	PAOZZ	10988	218-344	.NUT,TUBE COUPLING	2
45	XAOZZ	10988	L103224	.TUBE	1
46	XBOZZ	10988	L103283	TUBE ASSEMBLY STEERING RETURN	1
47	XAOZZ	10988	L103282	.TUBE	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
48	PAOZZ	10988	218-346	.NUT,TUBE COUPLING	2
49	PAOZZ	10988	218-366	.SLEEVE,FLARED,TUBE	2
50	XBOZZ	10988	218-5351	CONNECTOR, STEERING GEAR TO TUBES	2
51	XBOZZ	10988	218-5165	ADAPTER, STEERING RETURN	1
52	XBOZZ	10988	218-5280	ADAPTER, 90 DEGREES HOSE TO STEERING GEAR	1
53	PAOZZ	10988	R-28970	HOSE ASSEMBLY,NONME STEERING SUPPLY	1
54	XBOZZ	10988	L103247	TUBE ASSEMBLY, STEERING, TOP RIGHT.	1
55	XAOZZ	10988	L103246	.TUBE	1
56	XBOZZ	10988	218-343	.NUT	2
57	XBOZZ	10988	218-363	.SLEEVE	2
58	XBOZZ	10988	L103249	TUBE ASSEMBLY, STEERING, BOTTOM RIGHT	1
59	XAOZZ	10988	L103248	.TUBE	1
60	XBOZZ	10988	218-343	.NUT	2
61	XBOZZ	10988	218-363	.SLEEVE	2
62	PAOZZ	10988	218-673	NIPPLE,TUBE	2
63	PAOZZ	10988	L18331	STRAP,TIEDOWN,ELECT	1
64	PAOZZ	10988	218-5062	ADAPTER,STRAIGHT,TU	1
65	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	2
66	PAOZZ	96906	MS35338-45	WASHER,LOCK	2
67	PAOZZ	96906	MS27183-13	WASHER,FLAT	2
68	XBOZZ	30780	12S58XS	TEE, RELIEF VALVE TO HOSES	1
69	XBOZZ	10988	L104049	VALVE, RELIEF	1
70	PAOZZ	10988	113-182	BOLT,MACHINE	1
71	PAOZZ	10988	218-5060	ADAPTER,STRAIGHT,TU	1
72	XBOZZ	10988	L103337	TUBE ASSEMBLY, RELIEF VALVE SUPPLY.	1
73	XBOZZ	10988	218-365	.SLEEVE	2
74	XBOZZ	10988	218-345	.NUT,TUBE COUPLING	2
75	XAOZZ	10988	L103336	.TUBE	1
76	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
77	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
78	PAOZZ	96906	MS27183-15	WASHER,FLAT	2
79	PAOZZ	10988	A12308	CLIP,RETAINING	2
80	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H	2
81	PAOZZ	10988	218-5107	ELBOW 90 DEGREES	2

END OF FIGURE

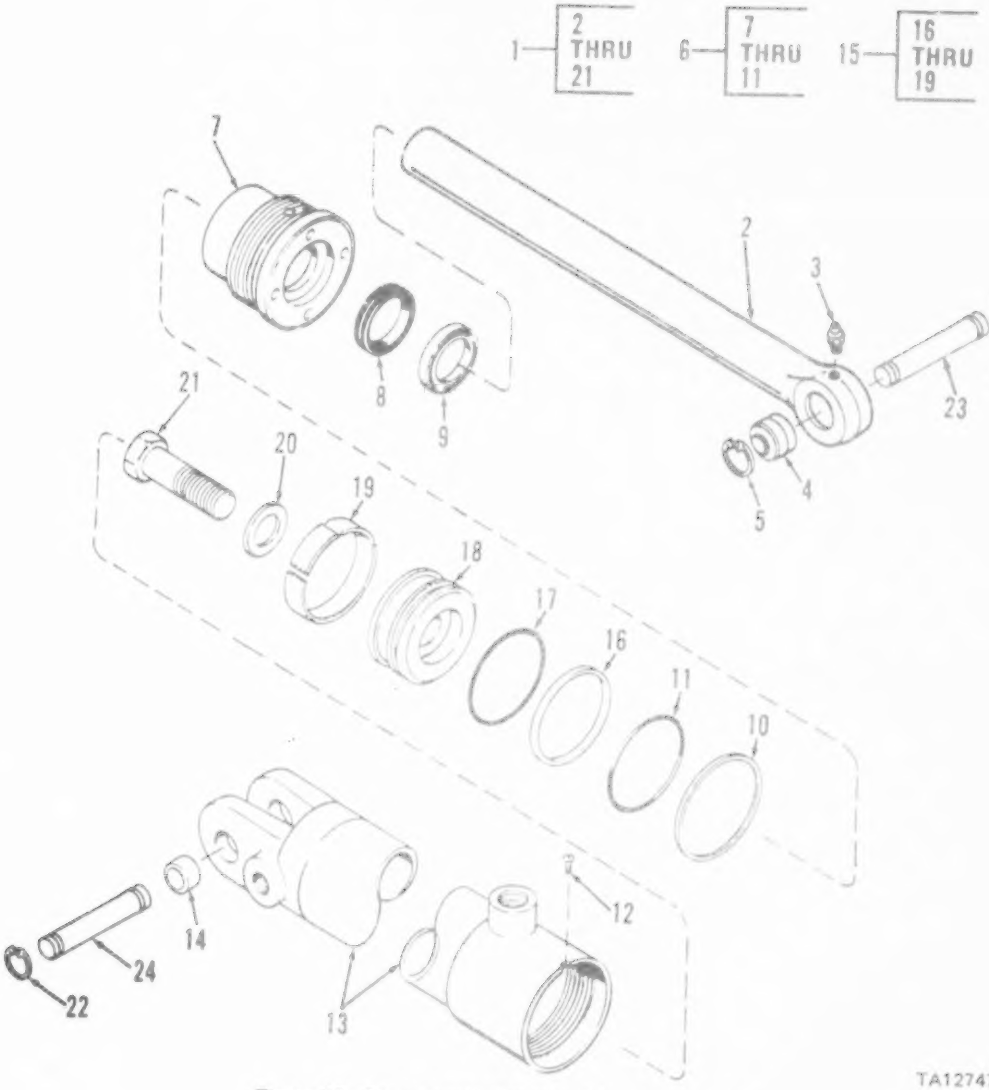
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Figure 77. Steering cylinder assembly and mounting.

GROUP 1412 HYDRAULIC OR AIR CYLINDER

FIG. 77 STEERING CYLINDER ASSEMBLY AND MOUNTING

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOFH	10988	G103727	CYLINDER ASSEMBLY,A STEERING.......	2
2	PAFZZ	10988	G34959	.ROD ASSY,HYDRAULIC.................	1
3	PAFZZ	96906	MS15003-1	.FITTING,LUBRICATION LUBRICATION...	1
4	PAFZZ	10988	D22200	.BEARING,PLAIN,SELF-...............	1
5	PAFZZ	96906	MS16625-1102	.RING,RETAINING.....................	2
6	PAFZZ	10988	G-34820	.COUPLING,HAFT,QUICK...............	1
7	XAFZZ	10988	G34816	..GLAND, PACKING....................	1
8	KFFZZ	10988	D36968	..PACKING,PREFORMED PART OF KIT P/N G34819............................	1
9	KFFZZ	10988	D95141	..WIPER PART OF KIT P/N G34819............................	1
10	KFFZZ	10988	A62070	..SEAL PART OF KIT P/N G34819............................	1
11	KFFZZ	10988	A60212	..O-RING PART OF KIT P/N G34819.....	1
12	PAFZZ	10988	187-1031	.SCREW..............................	1
13	XAFZZ	10988	G34954	.TUBE...............................	1
14	PAFZZ	10988	D34359	..BUSHING...........................	2
15	PAFZZ	10988	G35272	.PISTON ASSEMBLY,CYL................	1
16	KFFZZ	10988	A61430	..RING, SEAL PART OF KIT P/N G34819..........................	1
17	KFFZZ	10988	A61429	..O-RING, PART OF KIT P/N G34819..........................	1
18	XAFZZ	10988	G34817	..PISTON............................	1
19	KFFZZ	10988	G101837	..RING, WEAR PART OF KIT P/N G34819..........................	1
20	XDFZZ	10988	D43266	.WASHER.............................	1
21	PAFZZ	96906	MS90727-163	.SCREW,CAP,HEXAGON H................	1
22	PAOZZ	79136	5500-100	RING,RETAINING......................	6
23	PAOZZ	10988	L-60113	PIN,GROOVED,HEADED HEADED, ANTI-TURN..............................	2
24	PAOZZ	10988	L60302	PIN,GROOVED,HEADLES.................	2

END OF FIGURE

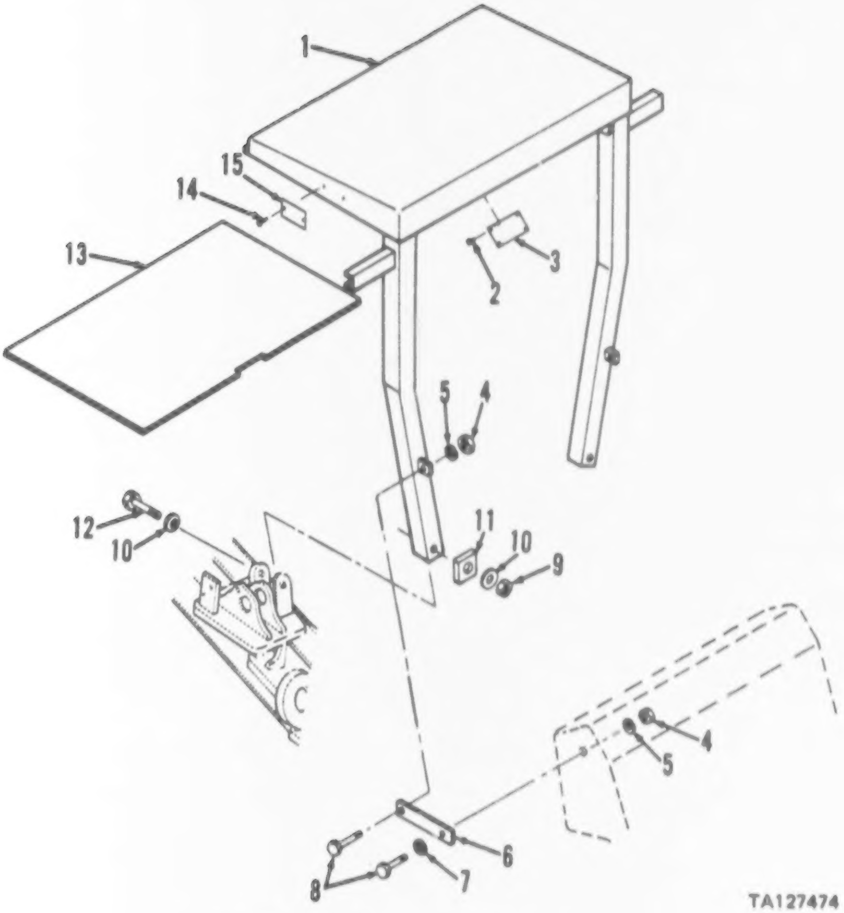
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Figure 78. Roll over protective structure.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 15 FRAME,TOWING ATTACHMENTS, AND DRAWBARS	
				GROUP 1501 FRAME ASSEMBLY	
				FIG. 78 ROLL OVER PROTECTIVE STRUCTURE	
1	PFOFF	10988	L102690	CANOPY,PROTECTIVE S WELDED ASSY....	1
2	PAOZZ	10988	151-525	RIVET................................	4
3	XBOZZ	10988	L102703	PLATE,IDENTIFICATIO IDENTIFICATION.	1
4	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON....................	4
5	PAOZZ	96906	MS35338-48	WASHER,LOCK..........................	4
6	XBOZZ	10988	L104008	STRAP, ROPS TIE......................	2
7	PAOZZ	96906	MS27183-19	WASHER,FLAT..........................	2
8	PAOZZ	96906	MS90725-113	SCREW,CAP,HEXAGON H..................	4
9	PAOZZ	96906	MS51922-72	NUT,SELF-LOCKING,HE..................	2
10	PAOZZ	10988	D37732	WASHER,FLAT..........................	4
11	XBOZZ	10988	L104014	PLATE, REINFORCING...................	2
12	PAOZZ	10988	13-16100	BOLT,MACHINE.........................	2
13	XDOZZ	10988	L104074	INSULATION BLANKET...................	1
14	XBOZZ	10988	151-539	RIVET, POP...........................	8
15	XBOZZ	10988	L103932	PLATE, WARNING, HEARING............	2

END OF FIGURE

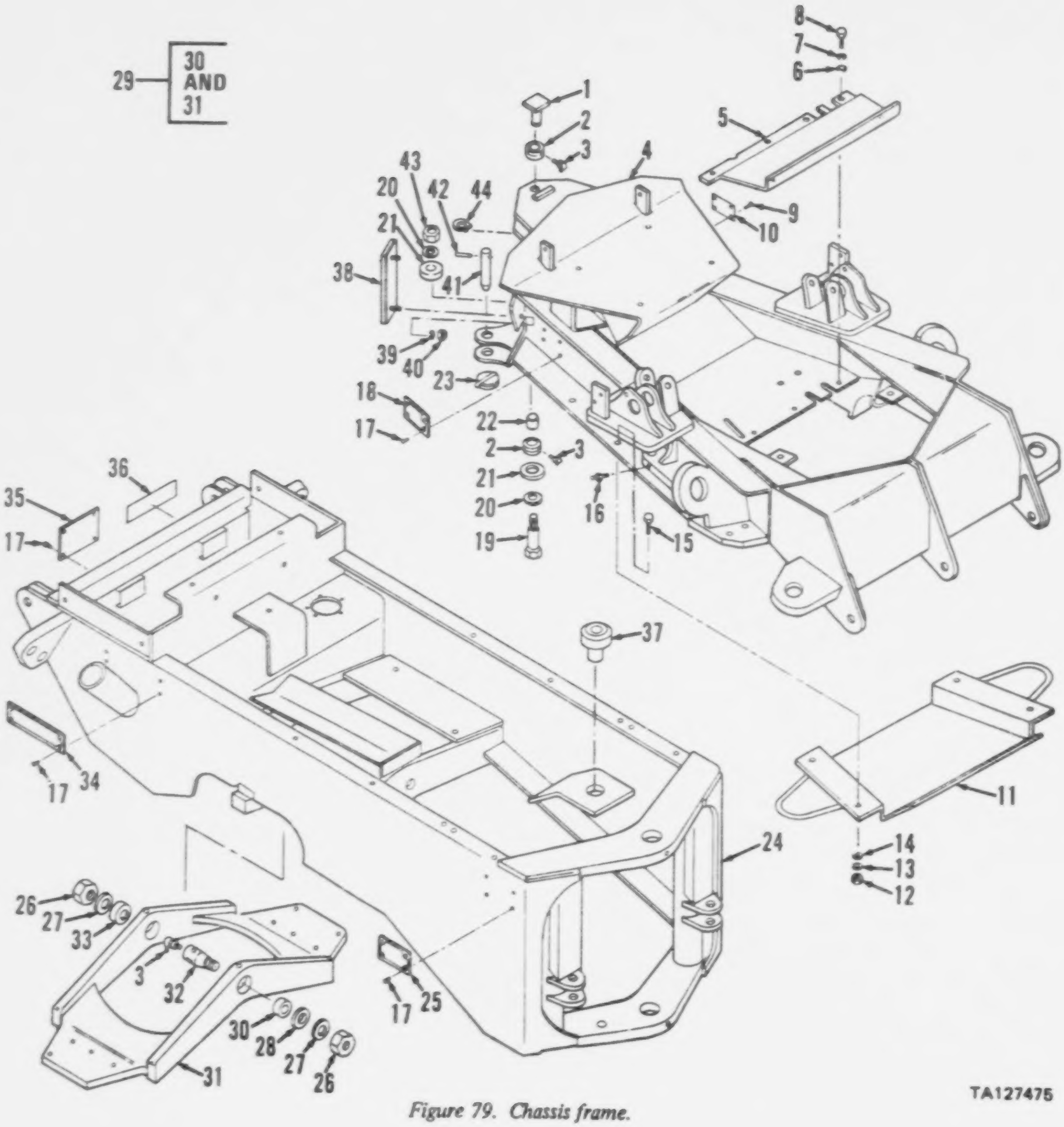
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Figure 79. Chassis frame.

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(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1501 FRAME,TOWING ATTACHMENTS, AND DRAWBARS	
				FIG. 79 CHASSIS FRAME	
1	PAFZZ	10988	L60099	PIN,GROOVED,HEADED	1
2	PAFZZ	51588	B20-L	BEARING,PLAIN,SELF-	2
3	PAFZZ	96906	MS15003-6	FITTING,LUBRICATION	4
4	XAHHH	10988	L101491	CHASSIS, FRONT WELDED	1
5	XBFZZ	10988	L101710	PLATE, FLOOR, FRONT	1
6	PAFZZ	96906	MS27183-15	WASHER,FLAT	6
7	PAFZZ	96906	MS35338-46	WASHER,LOCK	6
8	PAFZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H	6
9	XBOZZ	10988	151-544	RIVET, POP	4
10	PFOZZ	10988	L103942	PLATE,INSTRUCTION IDENTIFICATION, STEERING BYPASS VALVE	1
11	XBFZZ	10988	L103982	GUARD	1
12	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON	4
13	PAFZZ	96906	MS35338-48	WASHER,LOCK	4
14	PAOZZ	96906	MS27183-19	WASHER,FLAT	4
15	PAOZZ	96906	MS90725-113	SCREW,CAP,HEXAGON H	4
16	PAFZZ	96906	MS15003-1	FITTING,LUBRICATION	2
17	XBOZZ	10988	151-532	RIVET, POP	12
18	XBOZZ	10988	L103936	PLATE, IDENTIFICATION, SAFETY PIN..	1
19	PAFZZ	10988	L60008	PIN,STRAIGHT,THREAD	1
20	PAFZZ	10988	D34668	WASHER	2
21	XBFZZ	10988	L60200	SPACER, LOWER	2
22	PAFZZ	10988	L60551	BUSHING,SLEEVE PIVOT, LOWER	1
23	PAOZZ	99984	1600	PIN,STRAIGHT,HEADED	1
24	XAHHH	10988	L102669	CHASSIS, REAR	1
25	XBOZZ	10988	L103945	PLATE, DANGER	2
26	PAHZZ	96906	MS51922-83	NUT,SELF-LOCKING,HE	2
27	XBHZZ	10988	D36434	WASHER, FLAT	2
28	XBHZZ	10988	L47224	WASHER,FLAT TRUNNION	1
29	XBHZZ	10988	L102680	TRUNNION ASSEMBLY	1
30	PAHZZ	10988	D30933	.BUSHING,SLEEVE	2
31	XAHZZ	10988	L101772	.TRUNNION	1
32	XBHZZ	10988	L60132	PIN, TRUNNION PIVOT	2
33	XBHZZ	10988	D36478	WASHER, FLAT TRUNNION	1
34	XBOZZ	10988	L103938	PLATE, IDENTIFICATION, DIESEL FUEL.	1
35	XBOZZ	10988	L103947	PLATE, INSTRUCTION, TOWING	1
36	XBOZZ	10988	L104297	DECAL, REGISTRATION NO	1
37	PAOZZ	76005	J6198-9	MOUNT,SHOCK	2
38	PAOZZ	10988	L47997	BUMPER,RUBBER STOP	2
39	PAOZZ	96906	MS35338-46	WASHER,LOCK	4
40	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	4
41	PAOZZ	10988	L103477	PIN,STRAIGHT,HEADLE	1
42	PAOZZ	96906	MS16562-68	PIN,SPRING	1
43	PAFZZ	96906	MS51922-68	NUT,SELF-LOCKING,HE	1
44	PAFZZ	10988	D-26918	RING,RETAINING	1

END OF FIGURE

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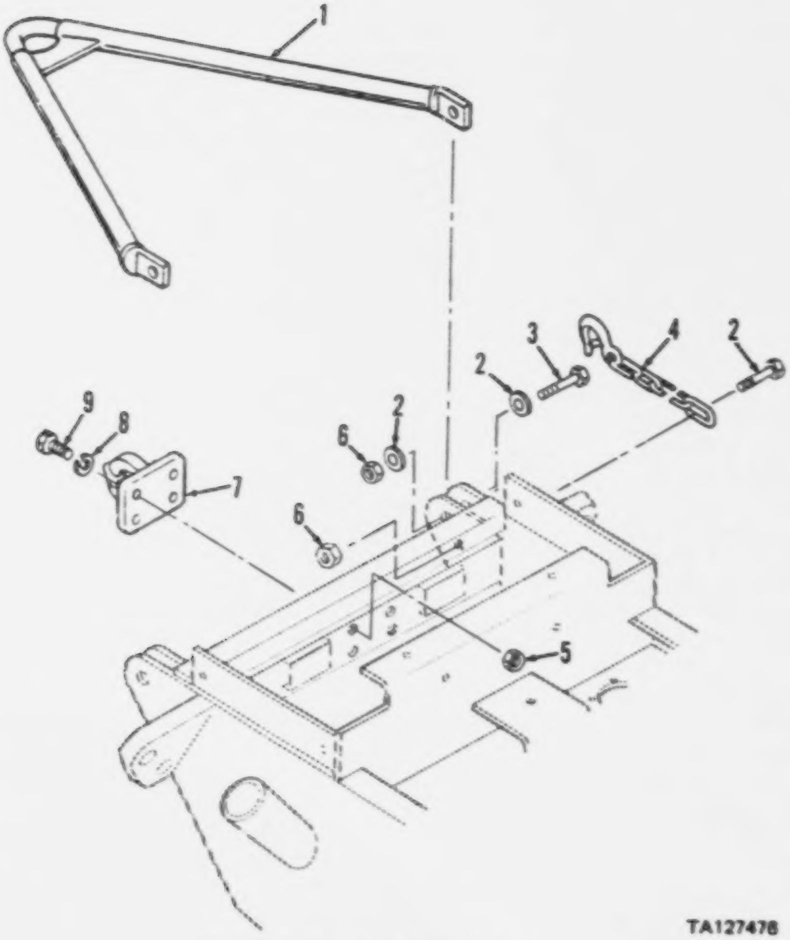
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Figure 80. Tow bar and pintle hook.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1503 PINTLES AND TOWING ATTACHMENTS	
				FIG. 80 TOW BAR AND PINTLE HOOK	
1	PAOZZ	10988	L103033	BAR, TOWING VEL......................	1
2	PAOZZ	96906	MS27183-24	WASHER,FLAT..........................	4
3	PAOZZ	96906	MS90728-190	SCREW,CAP,HEXAGON H..................	4
4	PAOZZ	10988	L103401	CHAIN,ASSY SINGLE....................	2
5	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON....................	4
6	PAOZZ	96906	MS51922-57	NUT,SELF-LOCKING,HE..................	4
7	PAOZZ	96906	MS51335-2	PINTLE ASSEMBLY,TOW..................	1
8	PAOZZ	96906	MS35338-48	WASHER,LOCK..........................	4
9	PAOZZ	96906	MS90728-116	SCREW,CAP,HEXAGON H..................	4

END OF FIGURE

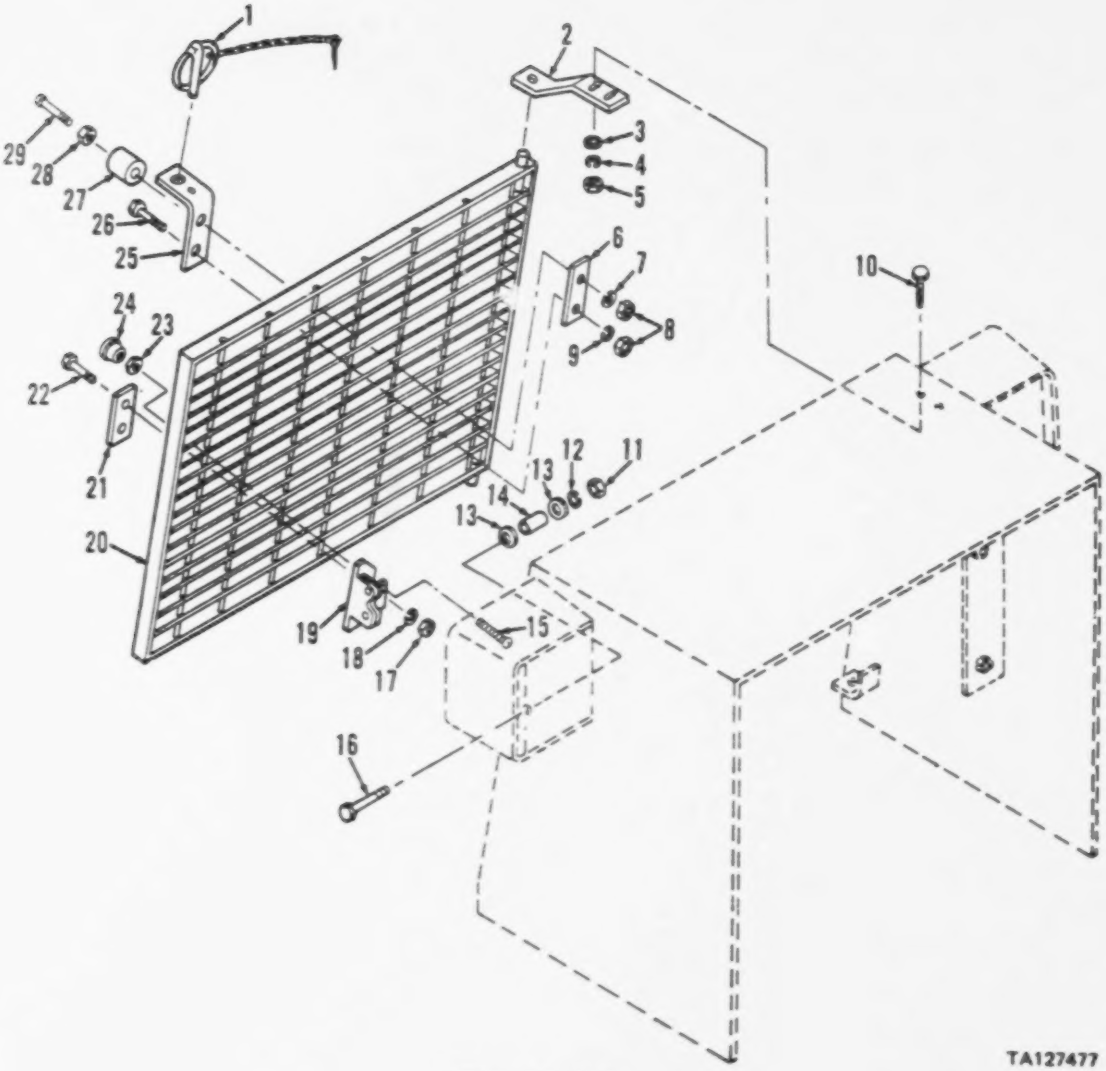
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Figure 81. Grille.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 18 BODY,CAB,HOOD AND HULL	
				GROUP 1801 BODY,CAB,HOOD AND HULL ASSEMBLIES	
				FIG. 81 GRILLE	
1	PAOZZ	99984	7525	PIN,STRAIGHT,HEADED	1
2	XBOZZ	10988	L102921	BRACKET, UPPER GRILLE PIVOT	1
3	PAOZZ	96906	MS27183-15	WASHER,FLAT	2
4	PAOZZ	96906	MS35338-46	WASHER,LOCK	2
5	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON	2
6	XBOZZ	10988	L102997	PLATE, MTG	1
7	PAOZZ	96906	MS35338-44	WASHER,LOCK	1
8	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON	2
9	PAOZZ	96906	MS35338-44	WASHER,LOCK	1
10	PAOZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H	2
11	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON	1
12	PAOZZ	96906	MS35338-45	WASHER,LOCK	1
13	PAOZZ	96906	MS27183-13	WASHER,FLAT	2
14	PFOZZ	10988	L11465	SPACER,SLEEVE	1
15	PAOZZ	10988	173-243	SCREW,MACHINE	1
16	PAOZZ	96906	MS90725-39	BOLT,MACHINE	1
17	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON	2
18	PAOZZ	96906	MS35338-44	WASHER,LOCK	
19	PAOZZ	19220	300R	LATCH,RADIATOR,REL	1
20	PFOZZ	10988	L102985	GRILLE,METAL GRATING	1
21	XBOZZ	10988	L102997	PLATE, LATCH MOUNTING	1
22	PAOZZ	96906	MS90728-13	SCREW,CAP,HEXAGON H	2
23	PAOZZ	96906	MS35691-1	NUT,PLAIN,HEXAGON	1
24	PAOZZ	80813	597	KNOB	1
25	XBOZZ	10988	L102998	BRACKET, TOW BAR	1
26	PAOZZ	96906	MS90728-13	SCREW,CAP,HEXAGON H	1
27	PAOZZ	70485	1326W	BUMPER, TOW BAR	1
28	PAOZZ	96906	MS35691-1	NUT,PLAIN,HEXAGON	1
29	PAOZZ	96906	MS35190-296	SCREW,MACHINE	1

END OF FIGURE

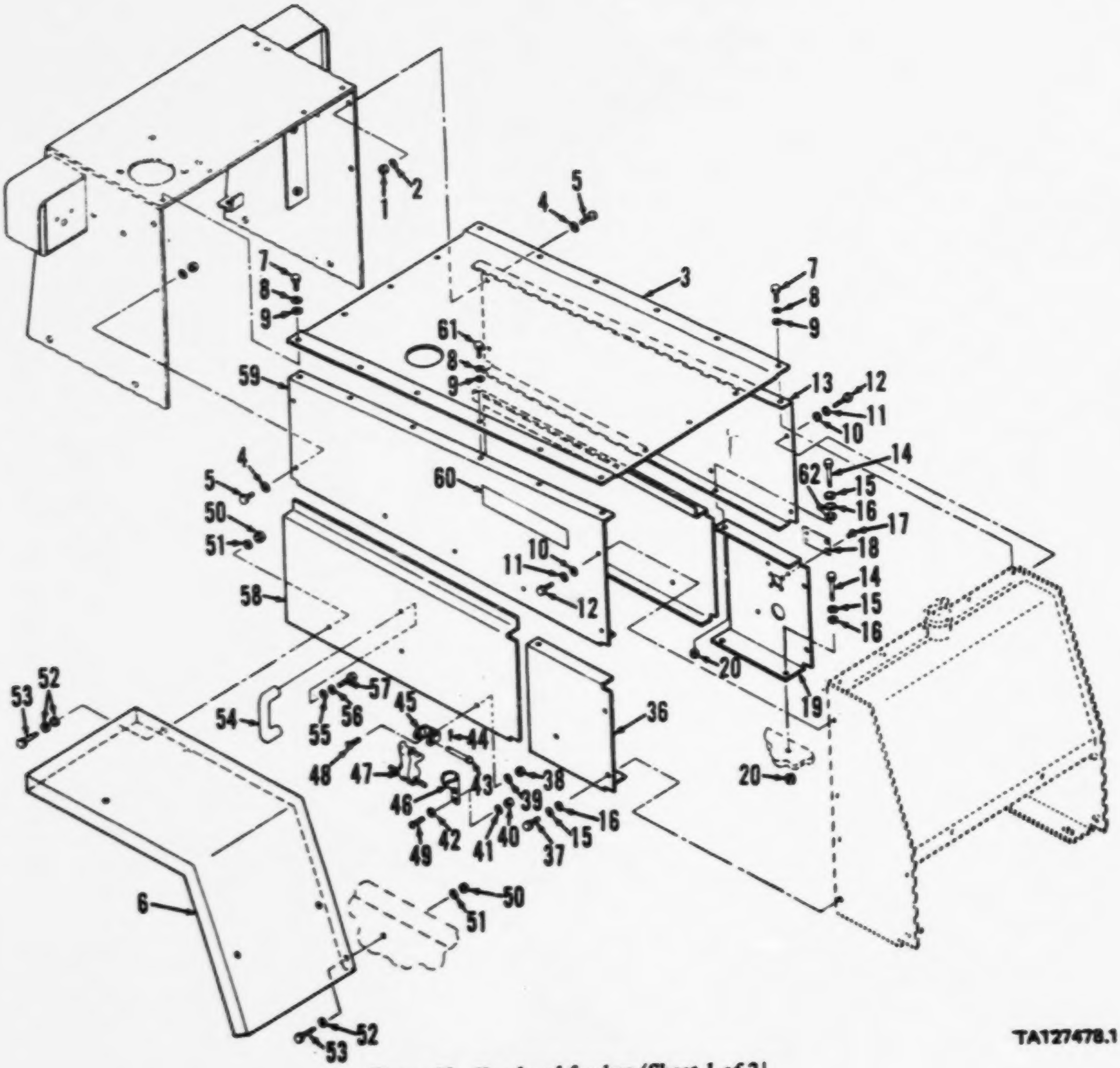
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Figure 82. Hood and fenders (Sheet 1 of 2)

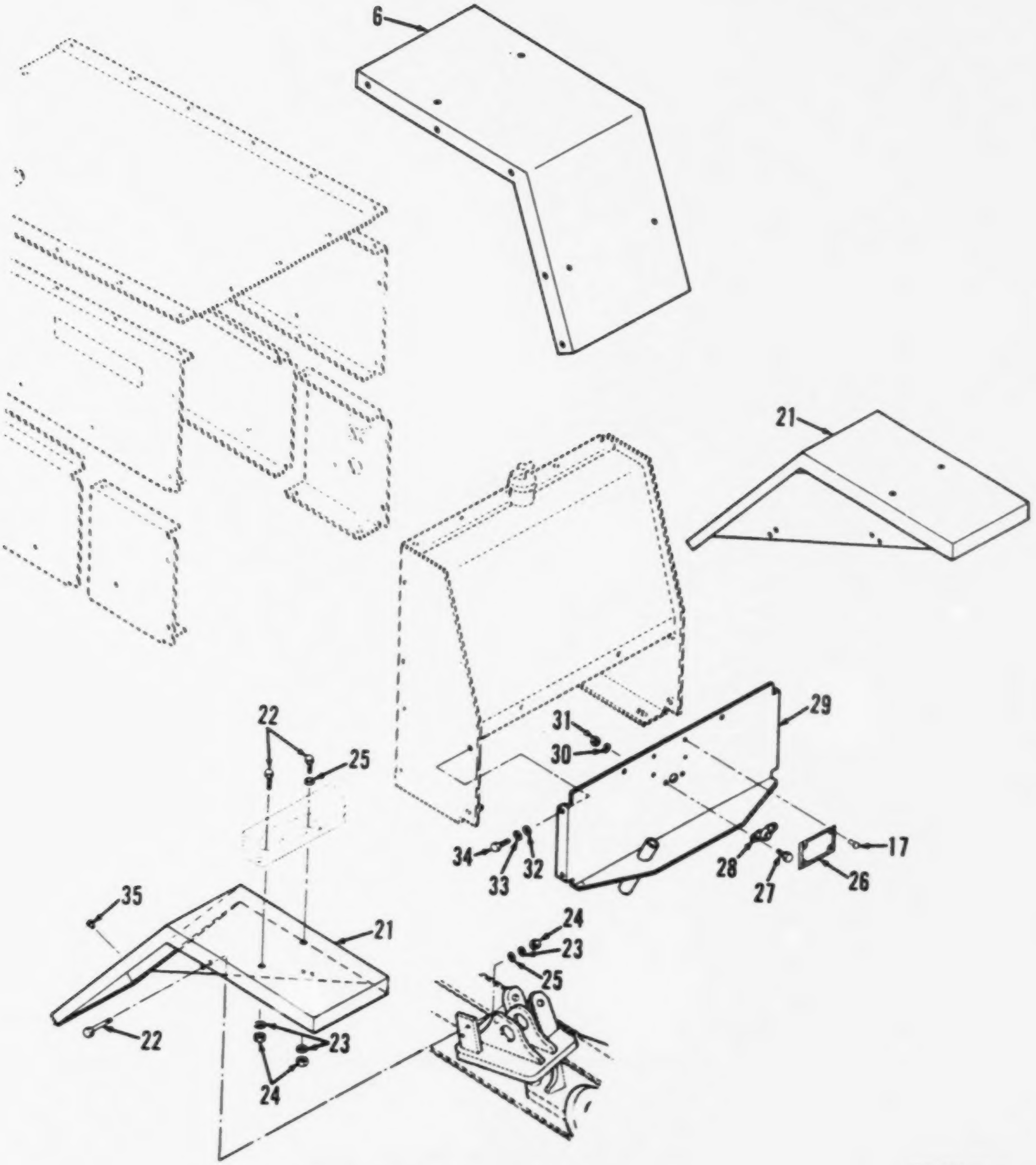
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Figure 82. Hood and fenders (Sheet 2 of 2)

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GROUP 1801 BODY,CAB,HOOD AND HULL ASSEMBLIES

FIG. 82 HOOD AND FENDERS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
1	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	4
2	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	4
3	XBOFF	10988	L102745	HOOD, TOP............................	1
4	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	4
5	PAOZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H..................	4
6	XBOZZ	10988	L103993	FENDER, REAR.........................	2
7	PAOZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H..................	10
8	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	18
9	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	18
10	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	4
11	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	4
12	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	4
13	XBOFF	10988	L102743	PANEL, HOOD, LH......................	1
14	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	6
15	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	10
16	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	12
17	XBOZZ	10988	151-539	RIVET, POP...........................	8
18	XBOZZ	10988	L103943	PLATE, IDENTIFICATION, SLAVE RECEPTACLE...........................	1
19	XBOZZ	10988	L102747	PLATE, HOOD SUPPORT LH...............	1
20	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON....................	6
21	XBOZZ	10988	L102872	FENDER, FRONT........................	2
22	PAOZZ	96906	MS90725-113	SCREW,CAP,HEXAGON H..................	8
23	PAOZZ	96906	MS35338-48	WASHER,LOCK..........................	8
24	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON....................	8
25	PAOZZ	96906	MS27183-18	WASHER,FLAT..........................	6
26	XBOZZ	10988	L103935	PLATE, IDENTIFICATION, AXLE DISCONNECT...........................	1
27	PAOZZ	96906	MS90725-6	SCREW,CAP,HEXAGON H..................	2
28	PAOZZ	87946	FMN6	BEARING,SLEEVE.......................	1
29	XBOZZ	10988	L103921	PANEL, FRONT COVER...................	1
30	PAOZZ	96906	MS35338-44	WASHER,LOCK..........................	2
31	PAOZZ	96906	MS51967-2	NUT,PLAIN,HEXAGON....................	2
32	PAOZZ	96906	MS27183-15	WASHER,FLAT..........................	6
33	PAOZZ	96906	MS35338-46	WASHER,LOCK..........................	6
34	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H..................	6
35	XBOZZ	10988	353-405	PLUG, HOLE, FRONT FENDER.............	4
36	XBOZZ	10988	L102746	PLATE, HOOD SUPPORT RH...............	1
37	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H..................	4
38	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON....................	4
39	PAOZZ	96906	MS35338-45	WASHER,LOCK..........................	4
40	PAOZZ	96906	MS35649-202	NUT,PLAIN,HEXAGON....................	8
41	PAOZZ	96906	MS35338-43	WASHER,LOCK..........................	8
42	PAOZZ	96906	MS27183-9	WASHER,FLAT..........................	8
43	PAOZZ	10988	T-11232	PIN,STRAIGHT,HEADED..................	4
44	PAOZZ	96906	MS24665-368	PIN,COTTER...........................	4
45	PAOZZ	74687	277-A-80	BRACKET,DOUBLE ANGL..................	4

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
46	PAOZZ	74687	028-561	BRACKET,ANGLE LOCK................	4
47	PAOZZ	74687	680842	HOOK,HOOD..........................	4
48	PAOZZ	96906	MS51957-94	SCREW,MACHINE......................	4
49	PAOZZ	96906	MS35190-273	SCREW,MACHINE......................	8
50	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON..................	10
51	PAOZZ	96906	MS35338-46	WASHER,LOCK........................	10
52	PAOZZ	96906	MS27183-15	WASHER,FLAT........................	18
53	PAOZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H................	10
54	PAOZZ	10988	A23725	HANDLE,MOUNTING....................	2
55	PAOZZ	96906	MS27183-13	WASHER,FLAT........................	4
56	PAOZZ	96906	MS35338-45	WASHER,LOCK........................	4
57	PAOZZ	96906	MS90725-32	BOLT,MACHINE.......................	4
58	PAOZZ	10988	L103919	PANEL,SIDE,VEHICULA................	2
59	PAOZZ	10988	L102741	HOOD,ENGINE COMPART................	1
60	XBOZZ	10988	L103939	DECAL, REGISTRATION NUMBER.........	2
61	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H................	8
62	PAOZZ	96906	MS27183-15	WASHER,FLAT........................	1

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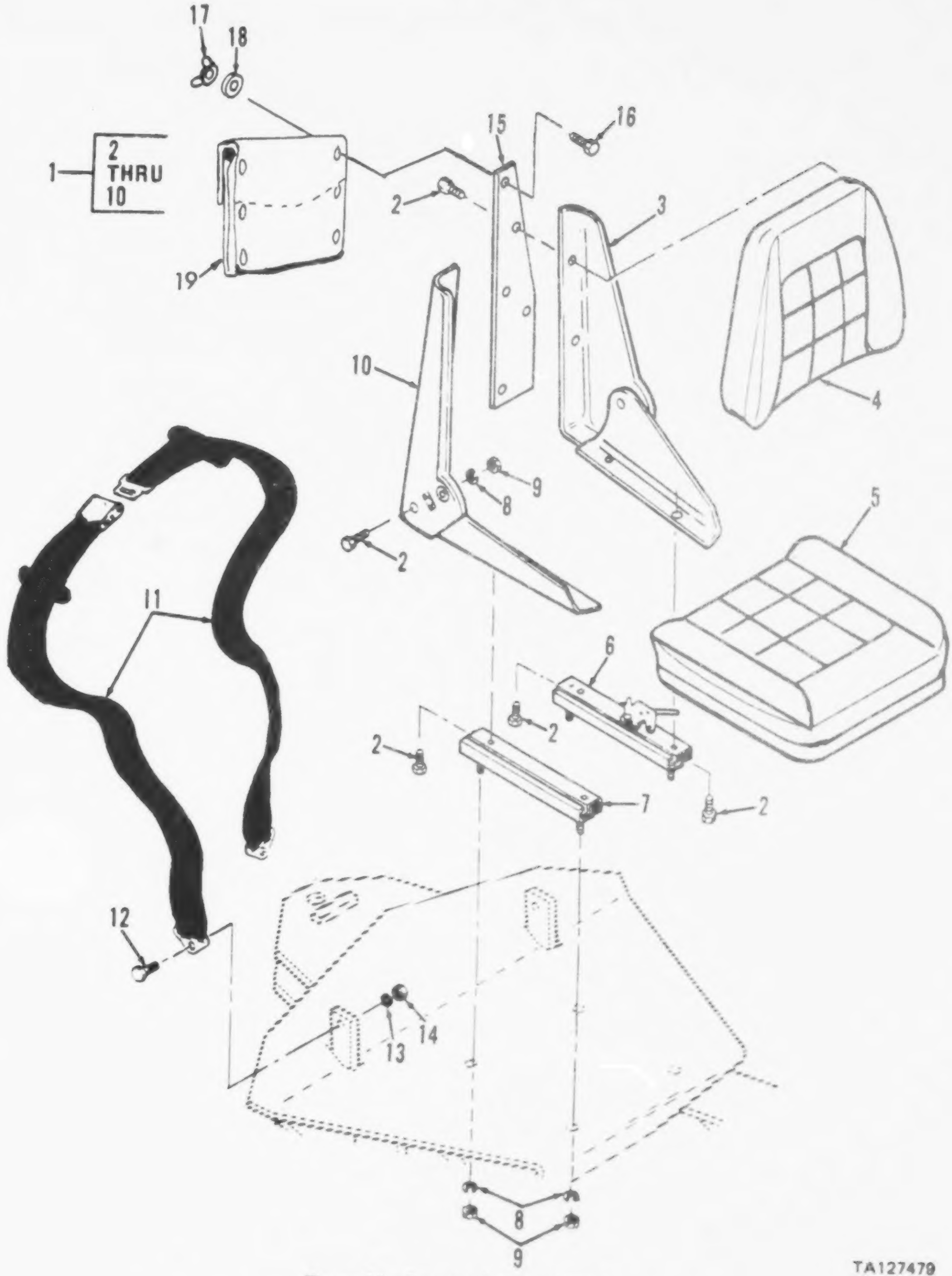

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Figure 83. Operator's seat assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1806 UPHOLSTERY SEATS AND CARPETS	
				FIG. 83 OPERATORS SEAT ASSEMBLY	
1	XBOFF	76359	F14003	SEAT,INDIVIDUAL OPERATOR............	1
2	PAOZZ	76359	1967CD	.SCREW,MACHINE......................	14
3	XBOZZ	76359	F2064-1	.RAIL, LH...........................	1
4	PAOZZ	76359	F6204-1	.CUSHION,SEAT BACK,V................	1
5	PAOZZ	76359	F4033-7	.CUSHION,SEAT BACK,V................	1
6	XBOZZ	76359	C3472-1	.ADJUSTER, SEAT.....................	1
7	PAOZZ	76359	2835CD	.SLIDE,STATIONARY,AD................	1
8	PAOZZ	08723	117	.WASHER,LOCK........................	6
9	PAOZZ	76359	402CD	.NUT,PLAIN,HEXAGON..................	6
10	XBOZZ	76359	F2064-2	.RAIL, RH...........................	1
11	PAOZZ	29944	F02205	BELT,VEHICULAR SAFE.................	1
12	PAOZZ	96906	MS18154-113	SCREW,CAP,HEXAGON H.................	2
13	PAOZZ	96906	MS35338-48	WASHER,LOCK.........................	2
14	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON...................	2
15	XBOZZ	10988	L105492	BRACKET, ANGLE......................	2
16	PAOZZ	10988	111-118	BOLT,SQUARE NECK....................	6
17	PAOZZ	96906	MS35425-39	NUT,PLAIN,WING......................	6
18	PAOZZ	10988	195-518	WASHER,FLAT.........................	6
19	PCOZZ	81349	MILB11743	CASE,MAINTENANCE AN.................	1

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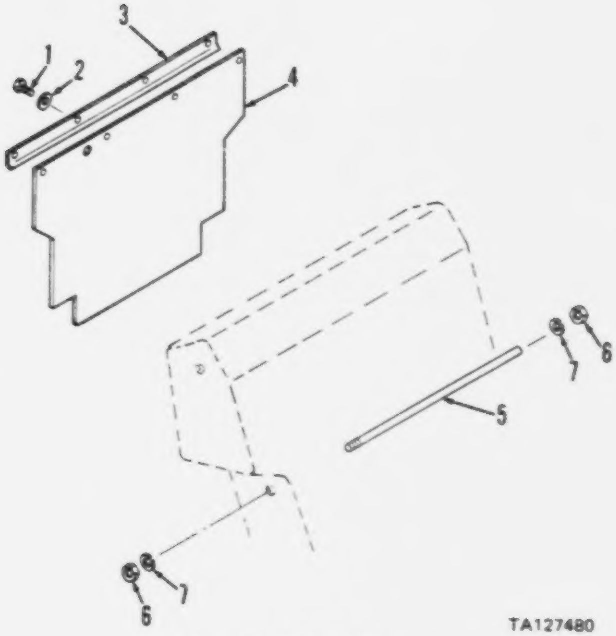

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Figure 84. Noise baffle mat.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 1806 UPHOLSTERY SEATS AND CARPETS	
				FIG. 84 NOISE BAFFLE PLATE	
1	PAOZZ	96906	MS90725-36	SCREW,CAP,HEXAGON H..................	4
2	PAOZZ	96906	MS27183-13	WASHER,FLAT...........................	4
3	PAOZZ	10988	L104168	STRAP,MOUNTING MAT....................	1
4	PAOZZ	10988	L104167	MAT,FLOOR.............................	1
5	PAOZZ	10988	L104080	ROD END,THREADED......................	1
6	PAOZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON.....................	2
7	PAOZZ	96906	MS35338-48	WASHER,LOCK...........................	2

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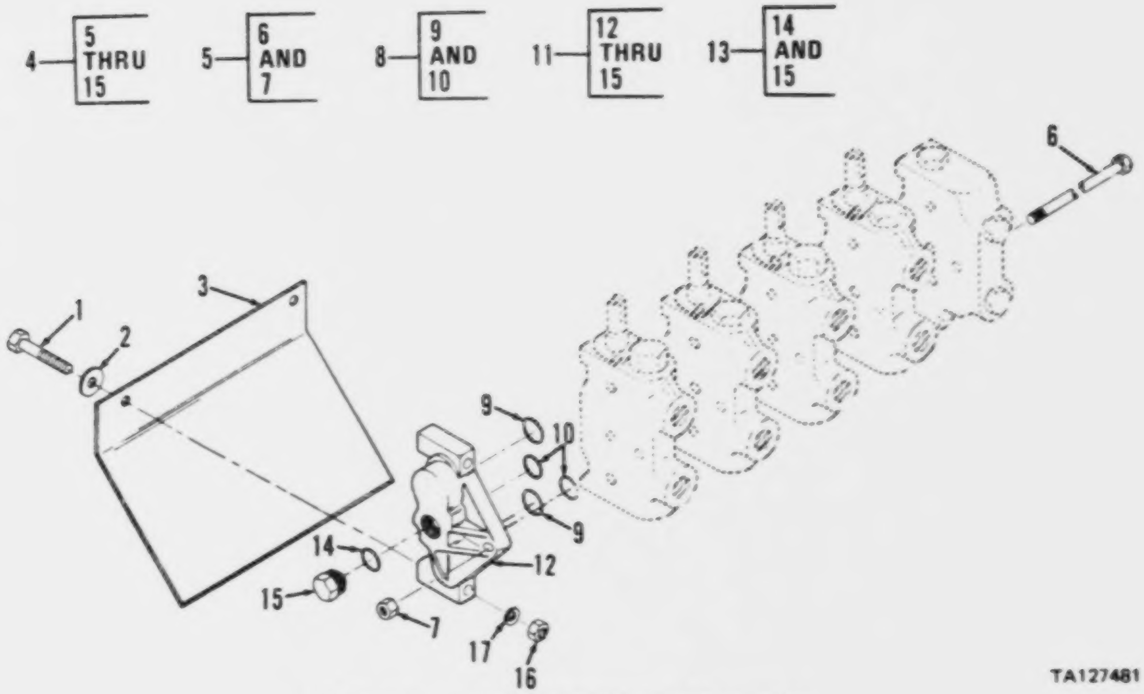
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Figure 85. Hydraulic control valve and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 24 HYDRAULIC LIFT COMPONENTS	
				GROUP 2402 HYDRAULIC CONTROL VALVE	
				FIG. 85 HYDRAULIC CONTROL VALVE AND MOUNTING	
1	PAFZZ	96906	MS90725-43	SCREW,CAP,HEXAGON H.................	3
2	PAFZZ	96906	MS27183-13	WASHER,FLAT.........................	3
3	XBFZZ	10988	L102791	PAN, OIL DRIP.......................	1
4	XBFHH	02249	V20-546-A	VALVE, CONTROL......................	1
5	XBHZZ	02249	5102-6821-004	.BOLT ASSEMBLY......................	1
6	XAHZZ	02249	8100-004	..SCREW, CAP........................	3
7	XAHZZ	02249	1856-001	..NUT,HEX...........................	3
9	PAHZZ	10988	A15888	..PACKING,PREFORMED.................	10
10	PAHZZ	02697	2-021N674-70	..PACKING,PREFORMED.................	10
11	XBHHH	02249	1052-6782-038	.PLATE, COVER, RIGHT SIDE..........	1
12	XAHZZ	02249	6770-011	..PLATE, COVER......................	1
13	XBHHH	02249	5072-6879-001	..PLUG..............................	1
14	PAHZZ	02249	2706-001	...PACKING,PREFORMED................	1
15	XAHZZ	02249	2684-001	...PLUG.............................	1
16	PAFZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON...................	3
17	PAFZZ	96906	MS35338-45	WASHER,LOCK.........................	3

END OF FIGURE

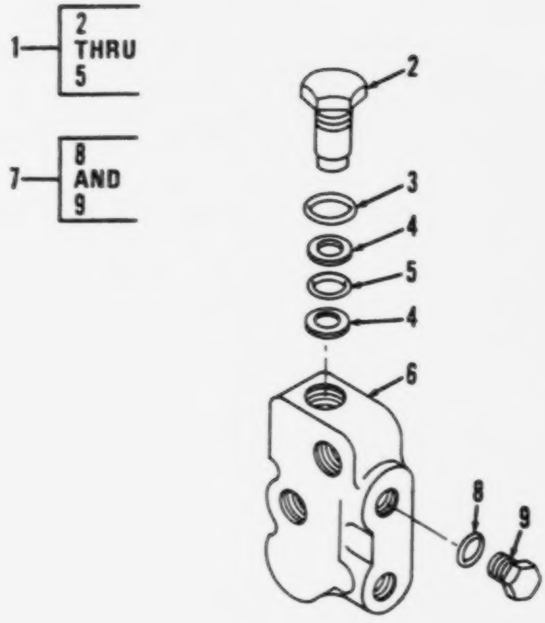
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Figure 86. Hydraulic control valve left side cover plate.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2402 HYDRAULIC CONTROL VALVE	
				FIG. 86 HYDRAULIC CONTROL VALVE LEFT SIDE COVER PLATE	
1	XBHHH	02249	5072-6762-001	.PLUG, RELIEF......................	1
2	KBHZZ	02249	6760-001	..PLUG PART OF KIT P/N K6132	1
3	KBHZZ	02249	1615-001	..PACKING,PREFORMED PART OF KIT P/N K-6132 PART OF KIT P/N K-28062......	1
4	KBHZZ	02249	6530-001	..WASHER, BACK-UP PART OF KIT P/N K-6132 PART OF KIT P/N K-28062........	2
5	KBHZZ	02249	1718-001	..PACKING,PREFORMED PART OF KIT P/N K-6132 PART OF KIT P/N K-28062......	1
6	XAHZZ	02249	8398-008	.COVER, PLATE, LEFT END............	1
7	XBHHH	02249	5072-6089-001	.PLUG..............................	2
8	PAHZZ	10988	218-5008	..PACKING,PREFORMED................	1
9	XAHZZ	02249	1726-001	..PLUG.............................	1

END OF FIGURE

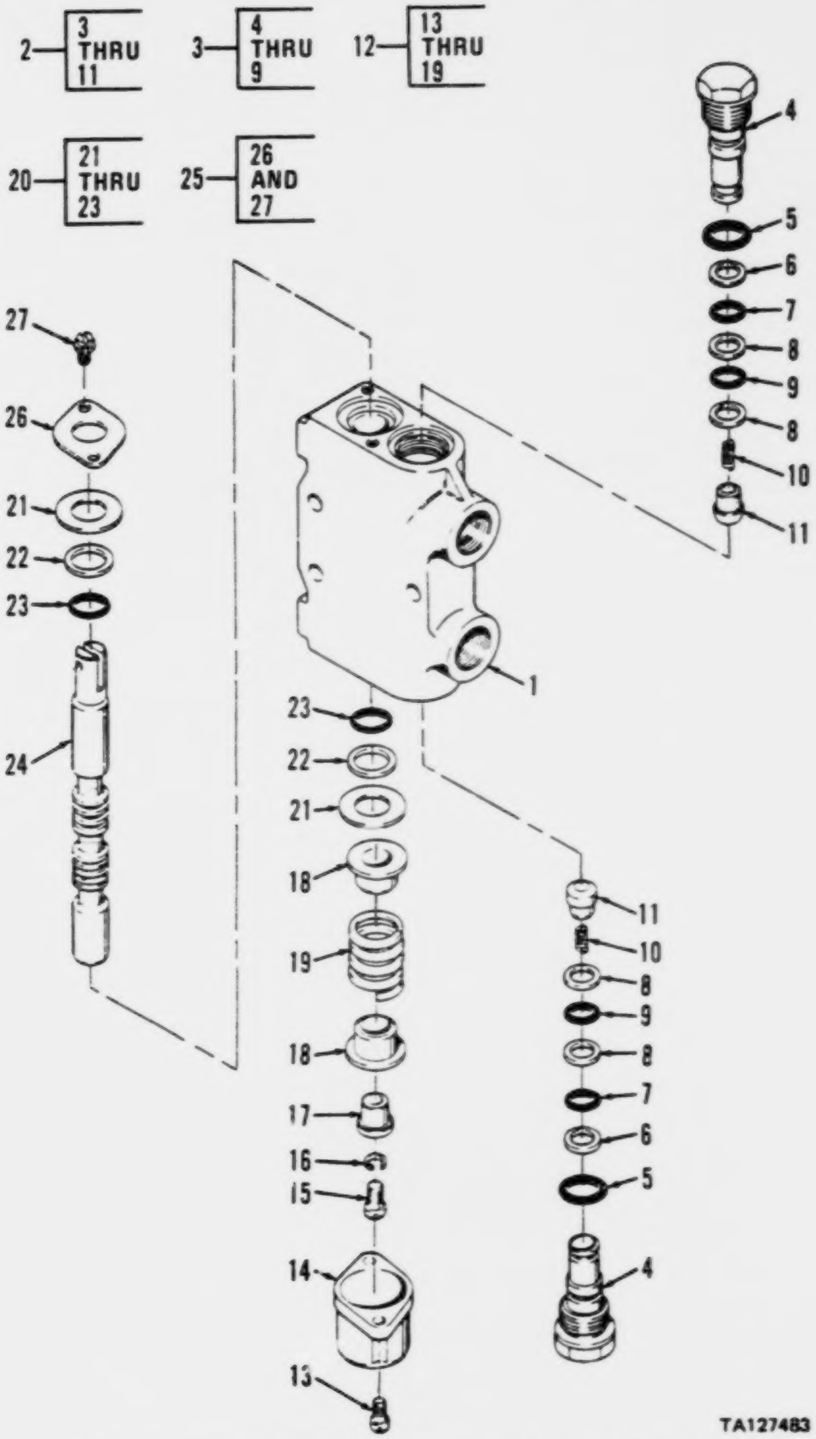
2—3 THRU 11
3—4 THRU 9
12—13 THRU 19
20—21 THRU 23
25—26 AND 27
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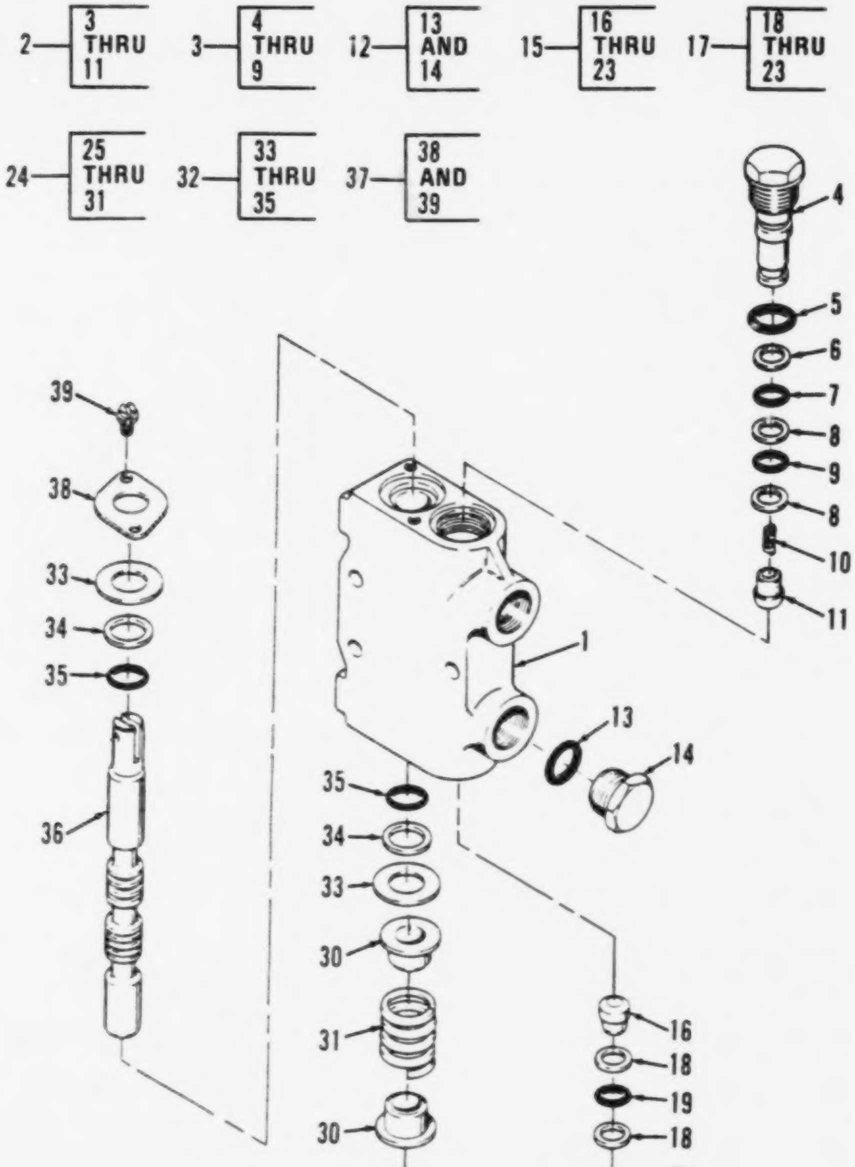
Figure 87. Hydraulic control valve, rotate, side shift, and tilt sections.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2402 HYDRAULIC CONTROL VALVE	
				FIG. 87 HYDRAULIC CONTROL VALVE, ROTATE,SIDE SHIFT,AND TILT SECTIONS	
	PAHHH	02249	1522-8134-183	VALVE SECTION, FOUR WAY.............	3
1	XAHZZ	02249	8072-006	.HOUSING, VALVE SECTION.............	1
2	XBHHH	02249	5072-6140-001	.PLUG, LOAD CHECK...................	2
3	XBHHH	02249	5072-6140-003	..PLUG, CHECK.......................	1
4	KBHZZ	02249	3411-001	...PLUG PART OF KIT P/N K-6030-A.........................	1
5	KBHZZ	02249	2707-001	...SEAL, O-RING PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	1
6	KBHZZ	02249	1821-001	...RING, BACK-UP PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	1
7	KBHZZ	02249	1819-001	...PACKING,PREFORMED PART OF KIT P/N K-6030-A PART OF KIT P/N K6032.....	1
8	KBHZZ	02249	1820-001	...RING, BACK-UP PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	2
9	KBHZZ	02249	1818-001	...PACKING,PREFORMED PART OF KIT P/N K-6030-A PART OF KIT P/N K6032.....	1
10	KBHZZ	02249	1868-001	..SPRING, POPPET PART OF KIT P/N K-6030-A............................	1
11	KBHZZ	02249	2781-001	..POPPET,VALVE,ENGINE PART OF KIT P/N K-6030-A.........................	1
12	XBHZZ	02249	5042-6139-007	.POSITIONER, SPOOL..................	1
13	KBHZZ	02249	1808-001	..SCREW PART OF KIT P/N K-6125......	2
14	KBHZZ	02249	1811-001	..CAP-PLUG,PROTECTIVE PART OF KIT P/N K-6125...........................	1
15	KBHZZ	96906	MS35265-96	..SCREW,MACHINE PART OF KIT P/N K-6125..............................	1
16	KBHZZ	96906	MS35338-45	..WASHER,LOCK PART OF KIT P/N K-6125	1
17	KBHZZ	02249	1810-001	..COLLAR, SPOOL PART OF KIT P/N K-6125..............................	1
18	KBHZZ	02249	1808-001	..COLLAR, SPRING PART OF KIT P/N K-6125..............................	2
19	KBHZZ	02249	7433-001	..SPRING, RETURN PART OF KIT P/N K-6125..............................	1
20	PAHZZ	02249	5092-6755-001	.PACKING ASSORTMENT,................	2
21	PAHZZ	02249	6752-001	..RETAINER	1
22	KBHZZ	02249	3265-001	..RING, BACK-UP PART OF KIT P/N K6035..............................	1
23	KBHZZ	02249	7700-001	..SEAL PART OF KIT P/N K6035........	1
24	XAHZZ	02249	8084-001	.SPOOL..............................	1
25	XBHZZ	02249	5032-6561-001	.RETAINER, SPOOL SEAL...............	1
26	KBHZZ	02249	6552-001	..PLATE, SEAL PART OF KIT P/N K-6033	1
27	KBHZZ	02249	0562-001	..SCREW, MACHINE PART OF KIT P/N K-6033..............................	2

END OF FIGURE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12 — 13 AND 14
15 — 16 THRU 23
17 — 18 THRU 23
24 — 25 THRU 31
32 — 33 THRU 35
37 — 38 AND 39
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Figure 88. Hydraulic control valve, lift section.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2402 HYDRAULIC CONTROL VALVE	
				FIG. 88 HYDRAULIC CONTROL VALVE, LIFT SECTION	
	PAHHH	02249	1522-8133-031	VALVE SECTION, THREE WAY............	1
1	XAHZZ	02249	8072-006	.HOUSING, VALVE SECTION............	1
2	XBHZZ	02249	5072-6140-001	.PLUG, LOAD CHECK................	1
3	XBHZZ	02249	5072-6140-003	..PLUG, CHECK.....................	1
4	KBHZZ	02249	3411-001	...PLUG PART OF KIT P/N K-6030-A........................	1
5	KBHZZ	02249	2707-001	...SEAL, O-RING PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	1
6	KBFZZ	02249	1821-001	...RING, BACKUP PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	1
7	KBHZZ	02249	1819-001	...PACKING,PREFORMED PART OF KIT P/N K-6030-A PART OF KIT P/N K6032.....	1
8	KBHZZ	02249	1820-001	...RING, BACK-UP, PART OF KIT P/N K-6030-A PART OF KIT P/N K6032........	2
9	KBHZZ	02249	1818-001	...PACKING,PREFORMED PART OF KIT P/N K-6030-A PART OF KIT P/N K6032.....	1
10	KBHZZ	02249	1868-001	...SPRING, POPPET, PART OF KIT P/N K-6030-A...........................	1
11	KBHZZ	02249	2781-001	...POPPET,VALVE,ENGINE PART OF KIT P/N K-6030-A......................	1
12	XBHHH	02249	5072-7054-001	.PLUG.............................	1
13	PAHZZ	02249	2707-001	..PACKING,PREFORMED...............	1
14	XAHZZ	02249	1458-001	..PLUG............................	1
15	XBHHH	02249	5072-6140-006	..PLUG, THREE WAY CONVERSION.......	1
16	XBHZZ	02249	6754-001	..PLUG, THREE WAY..................	1
17	XBHZZ	02249	5172-6140-003	..PLUG, CHECK......................	1
18	PAHZZ	02249	1819-001	...PACKING,PREFORMED..............	2
19	PAHZZ	02249	1818-001	...PACKING,PREFORMED..............	1
20	PAHZZ	02249	1819-001	...PACKING,PREFORMED..............	1
21	PAHZZ	02249	1821-001	...RING,RETAINING..................	1
22	PAHZZ	02249	2707-001	...PACKING,PREFORMED..............	1
23	XAHZZ	02249	3411-001	...PLUG...........................	1
24	XAHZZ	02249	5042-6139-007	.POSITIONER, SPOOL................	1
25	KBHZZ	02249	1808-001	..SCREW PART OF KIT P/N K-6125.......	2
26	KBHZZ	02249	1811-001	..CAP-PLUG,PROTECTIVE PART OF KIT P/N K-6125..........................	1
27	PAHZZ	96906	MS35265-96	..SCREW,MACHINE PART OF KIT P/N K-6125.................................	1
28	PAHZZ	96906	MS35338-45	..WASHER,LOCK PART OF KIT P/N K-6125	1
29	KBHZZ	02249	1810-001	..COLLAR, SPOOL PART OF KIT P/N K-6125.................................	1
30	KBHZZ	02249	1809-009	..COLLAR, SPRING PART OF KIT P/N K-6125.................................	2
31	KBHZZ	02249	7433-001	..SPRING, RETURN PART OF KIT P/N K-6125.................................	1
32	PAHZZ	02249	5092-6755-001	.PACKING ASSORTMENT,..............	2
33	PAHZZ	02249	6752-001	..RETAINER RETAINER...............	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
34	KBHZZ	02249	3265-001	..RING, BACK-UP PART OF KIT P/N K6035................................	1
35	KBHZZ	02249	7700-001	..SEAL PART OF KIT P/N K6035........	1
36	XAHZZ	02249	8366-001	.SPOOL, THREE WAY....................	1
37	XBHZZ	02249	5032-6561-001	.RETAINER, SPOOL SEAL..............	1
38	KBHZZ	02249	6552-001	..PLATE, SEAL, PART OF KIT P/N K-6033................................	1
39	KBHZZ	02249	75-410	..SCREW, MACHINE, PART OF KIT P/N K-6033................................	2

END OF FIGURE

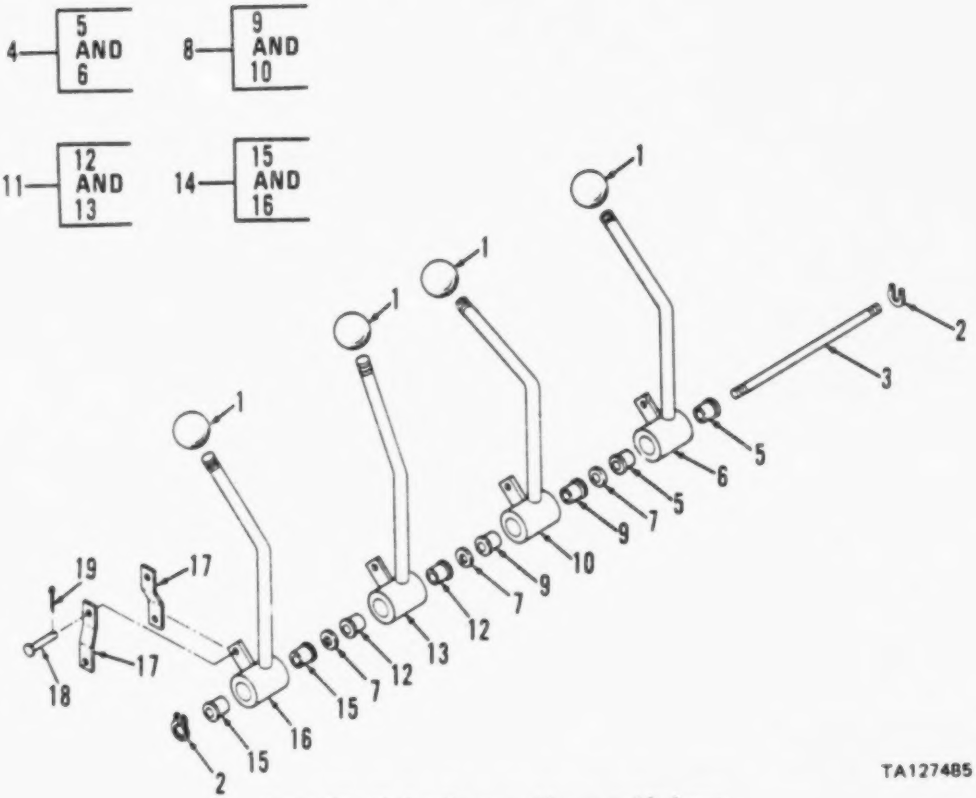
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Figure 89. Hydraulic control levers and linkages.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2403 HYDRAULIC CONTROL LEVERS AND LINKAGE	
				FIG. 89 HYDRAULIC CONTROL LEVERS AND LINKAGES	
1	PAOZZ	72512	35D	KNOB..................................	4
2	PAOZZ	79136	5100-62	RING,RETAINING........................	2
3	XBOZZ	10988	L60172	SHAFT, PIVOT, LEVER CONTROL........	1
4	XBOZZ	10988	L103238	LEVER, ROTATE CONTROL..............	1
5	PAOZZ	70417	FF-718-1	.BEARING,SLEEVE LEVER..............	2
6	XAOZZ	10988	L103168	.LEVER................................	1
7	PAOZZ	96906	MS27183-21	WASHER,FLAT SPACING................	3
8	XBOZZ	10988	L103239	LEVER, SIDE SHIFT CONTROL..........	1
9	PAOZZ	70417	FF-718-1	.BEARING,SLEEVE LEVER..............	2
10	XAOZZ	10988	L103170	.LEVER................................	1
11	XBOZZ	10988	L103240	LEVER, LIFT CONTROL................	1
12	PAOZZ	70417	FF-718-1	.BEARING,SLEEVE LEVER..............	2
13	XAOZZ	10988	L103172	.LEVER................................	1
14	XBOZZ	10988	L103241	LEVER, TILT CONTROL................	1
15	PAOZZ	70417	FF-718-1	.BEARING,SLEEVE LEVER..............	2
16	XAOZZ	10988	L103174	.LEVER................................	1
17	XBOZZ	10988	L60129	LINK,VALVE...........................	8
18	PAOZZ	96906	MS35810-2	PIN STRAIGHT HEADED................	8
19	PAOZZ	96906	MS24665-132	PIN,COTTER...........................	8

END OF FIGURE

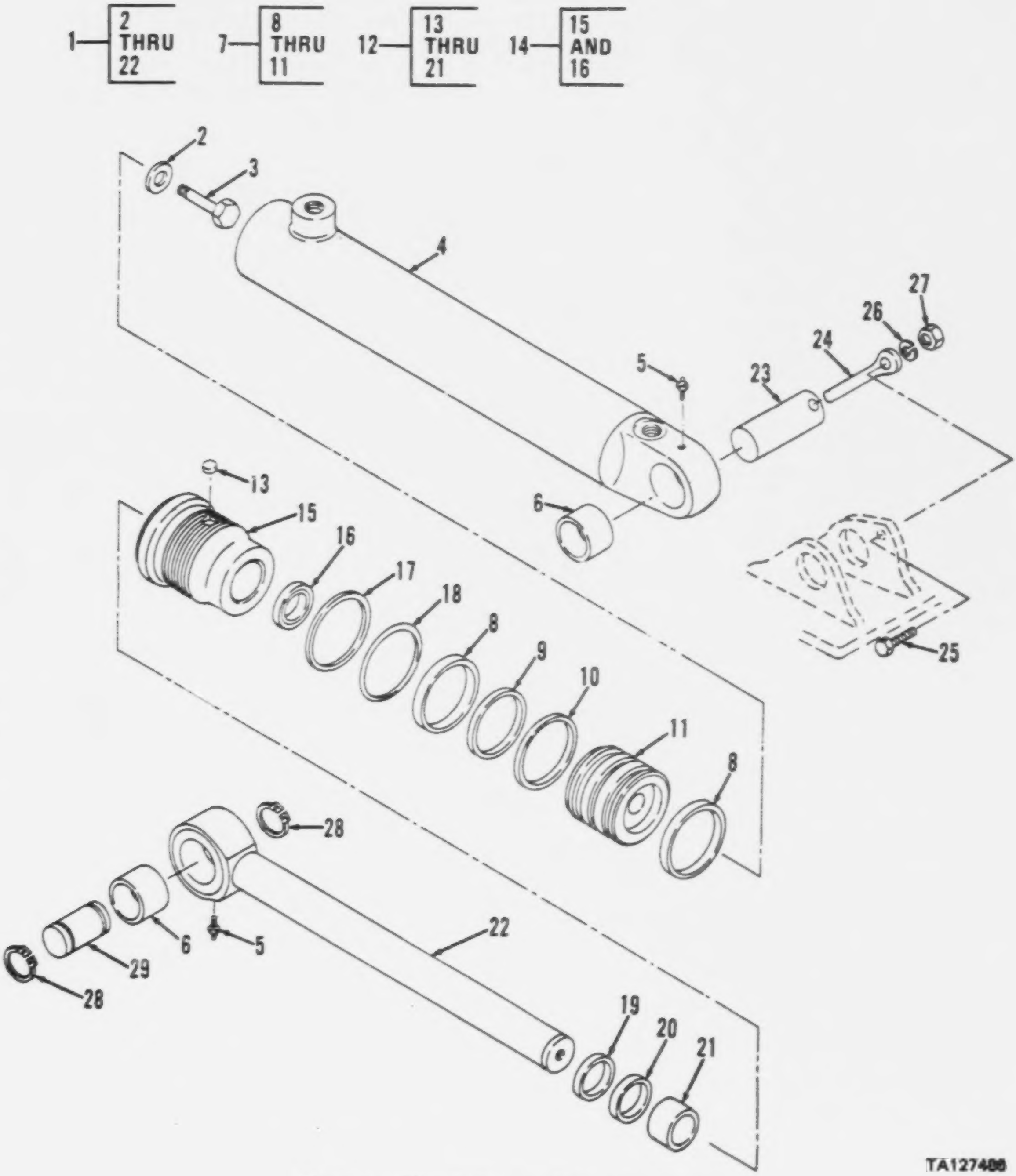
1 — 2 THRU 22
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Figure 90. Tilt cylinder assembly and mounting.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2404 HYDRAULIC TILT CYLINDERS AND TILT CRANK	
				FIG. 90 TILT CYLINDER ASSEMBLY AND MOUNTING	
1	PAFFH	10988	G103549	CYLINDER,ACTUATING TILT............	2
2	PAFZZ	10988	G32317	.WASHER,FLAT........................	1
3	PAFZZ	96906	MS90727-189	.SCREW,CAP,HEXAGON H...............	1
4	XBFZZ	10988	G103550	.TUBE..............................	1
5	PAFZZ	96906	MS15003-2	.FITTING,LUBRICATION LUBRICATION...	3
6	PAFZZ	10988	D30930	.BUSHING,TABULATION................	2
7	XBFZZ	10988	G100441	.PISTON ASSEMBLY (NSS).............	1
8	KFFZZ	10988	G100449	..RING,WEARING PART OF KIT P/N G102404................	2
9	KFFZZ	10988	G100444	..GASKET PART OF KIT P/N G102404 PART OF KIT P/N G102404.............	1
10	PAFZZ	10988	G100443	..RETAINER,PACKING.................	1
11	PAFZZ	10988	G100442	..PISTON,LINEAR ACTUA..............	1
12	XBFZZ	10988	G103557	.GLAND ASSEMBLY....................	1
13	XBFZZ	10988	G102569	..PLUG.............................	1
14	XBFZZ	10988	G103558	..GLAND ASSEMBLY...................	1
15	XAFZZ	10988	G103559	...GLAND...........................	1
16	PAFZZ	10988	G34299	...SPACER,RING.....................	1
17	KFFZZ	10988	G32122	..PACKING,PREFORMED PART OF KIT P/N G102404...........................	1
18	KFFZZ	10988	A30095	..O-RING PART OF KIT PART OF KIT P/N G102404..........................	1
19	PAFZZ	10988	D36969	..PACKING,PREFORMED PART OF KIT P/N G102404...........................	1
20	PAFZZ	10988	G102569	..PLUG,EXPANSION PART OF KIT P/N G102404...........................	1
21	KFFZZ	10988	G102424	..BEARING,SLEEVE PART OF KIT P/N G102404...........................	1
22	XBFZZ	10988	G101127	.ROD...............................	1
23	PAFZZ	10988	L102792	PIN STRAIGHT HEADLE CYLINDER TO CHASSIS...........................	2
24	PAFZZ	10988	R17756	CONNECTOR,ROD END..................	2
25	PAFZZ	96906	MS90728-114	SCREW,CAP,HEXAGON H................	2
26	PAFZZ	96906	MS35338-48	WASHER,LOCK........................	2
27	PAFZZ	96906	MS51967-14	NUT,PLAIN,HEXAGON..................	2
28	PAFZZ	79136	5500-150	RING,RETAINING.....................	4
29	PAFZZ	10988	D-44841	PIN,GROOVED,HEADLES CYLINDER TO MAST..............................	2 1

END OF FIGURE

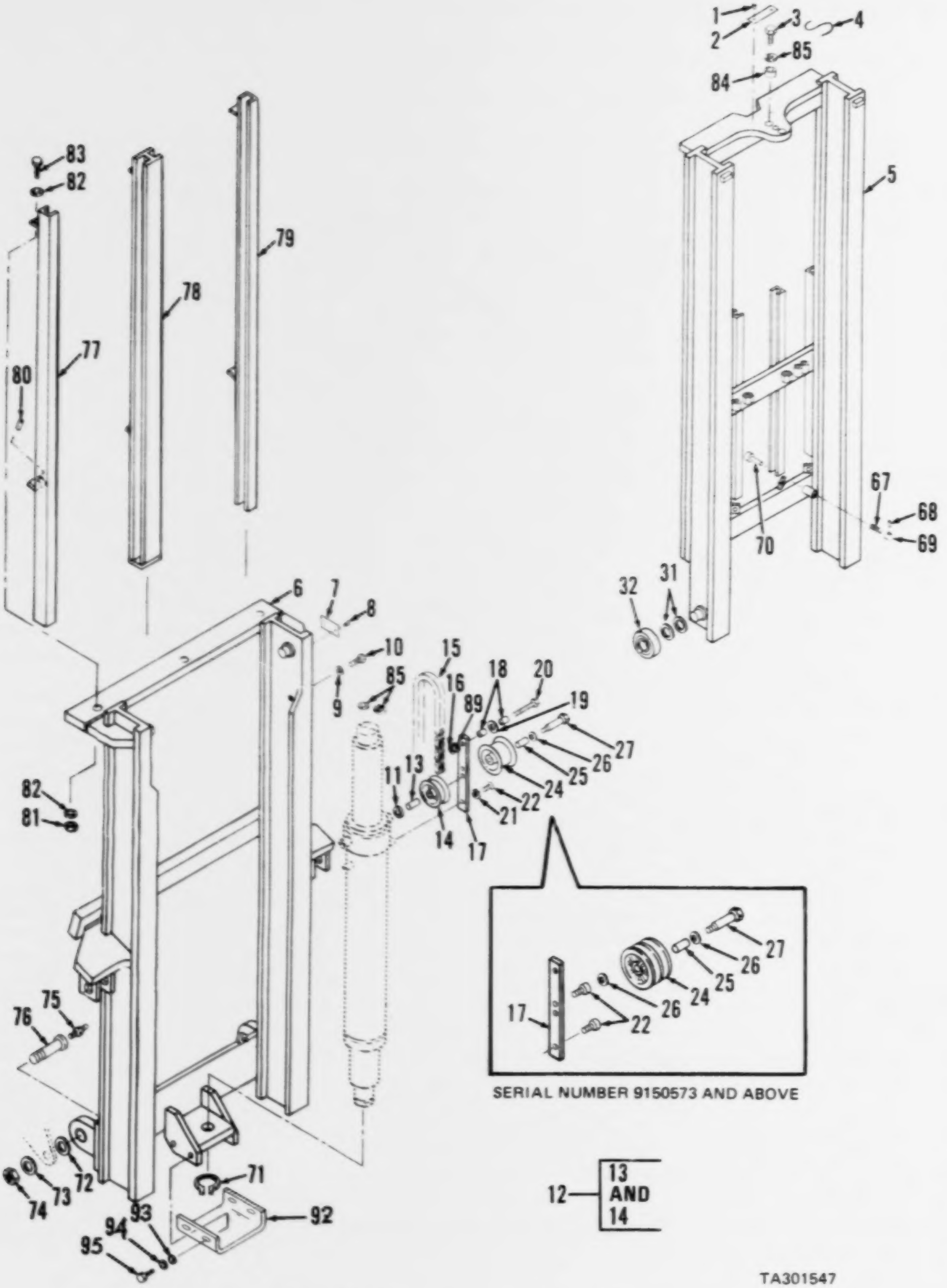
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Figure 91. Mast and carriage (Sheet 1 of 2).

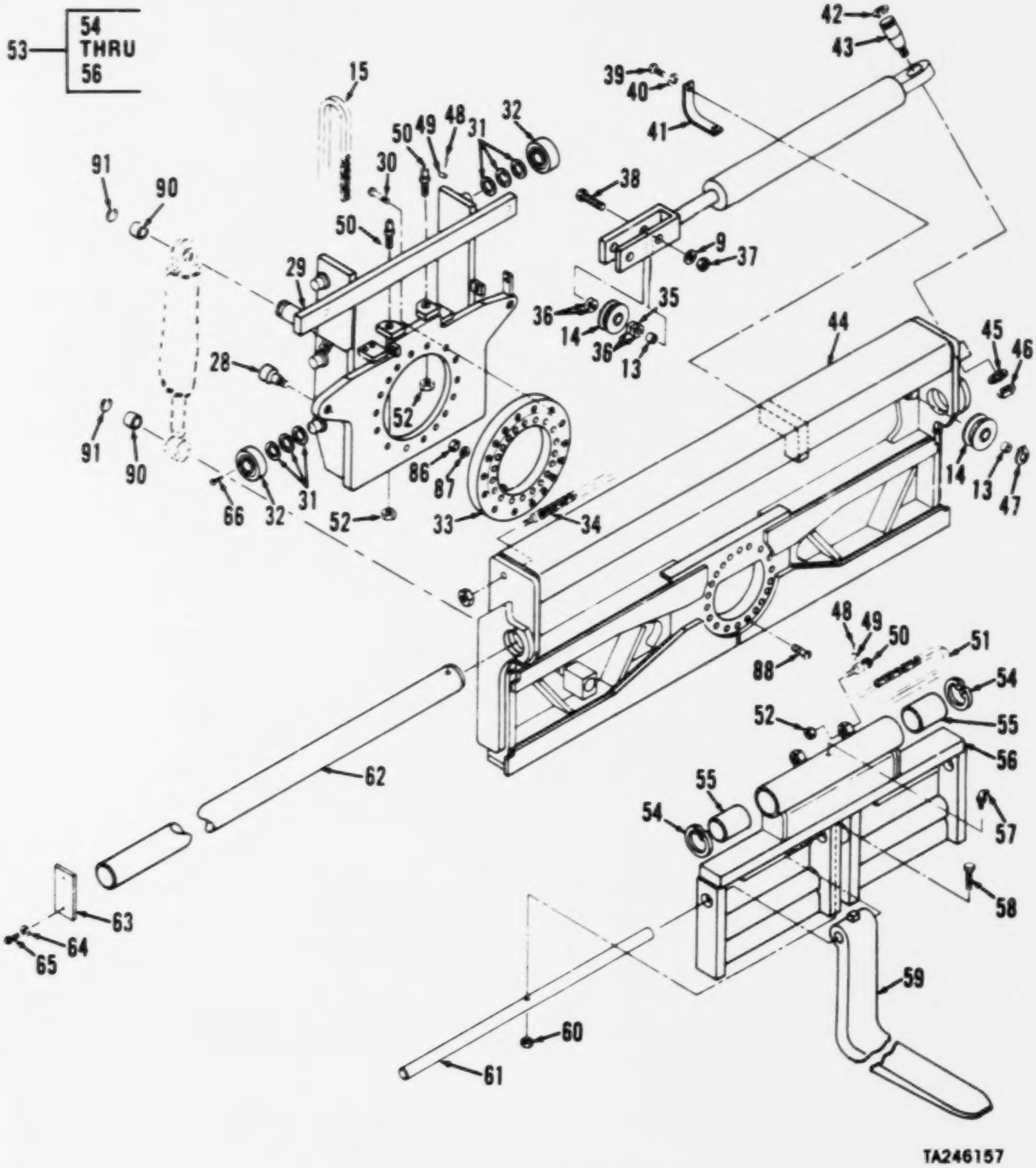
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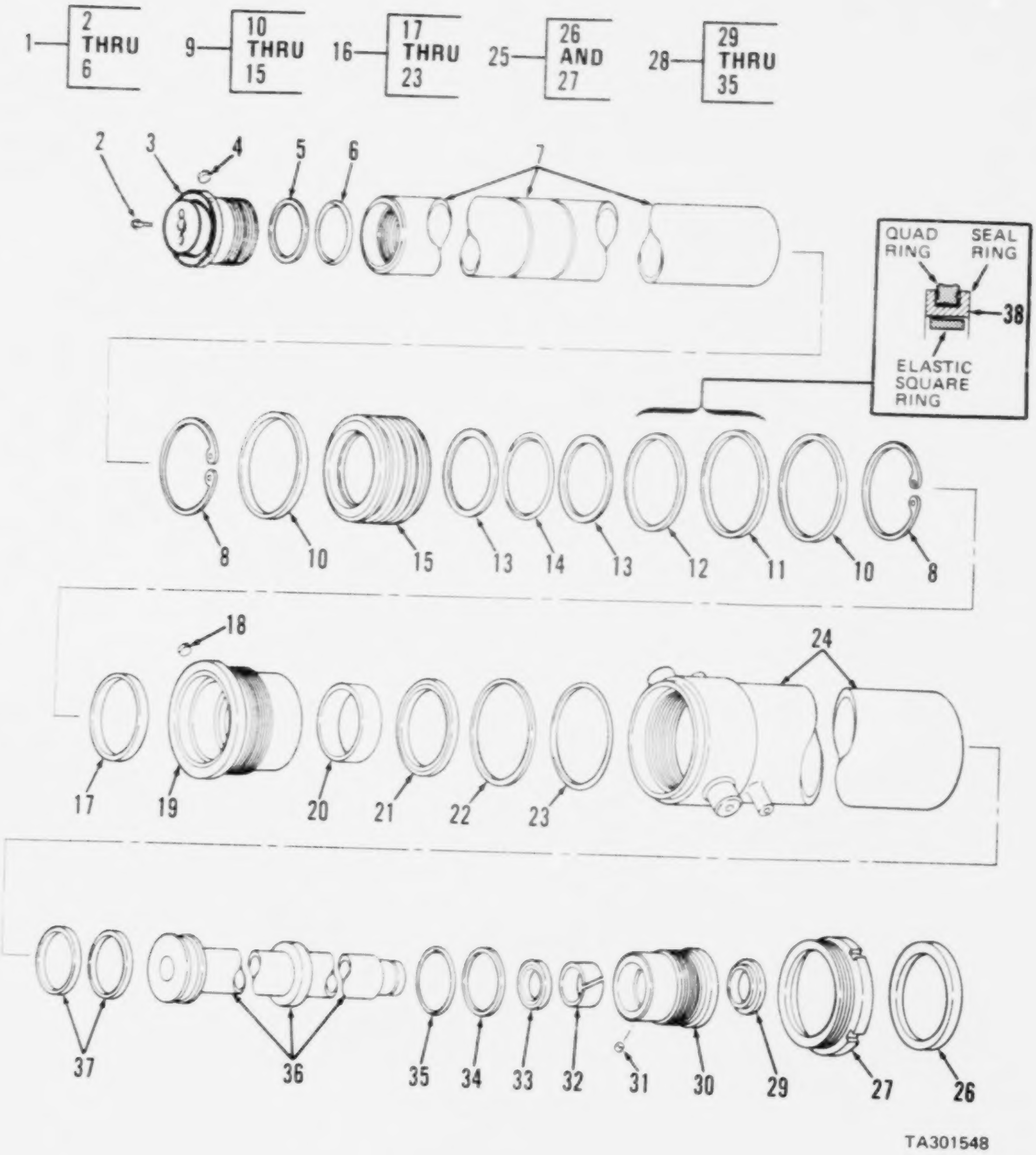
Figure 91. Mast and carriage (Sheet 2 of 2).

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2405 HYDRAULIC MAST COLUMN	
				FIG. 91 MAST AND CARRIAGE	
1	XBOZZ	10988	151-532	RIVET, POP............................	2
2	XBOZZ	10988	L103937	PLATE, IDENTIFICATION, BLEED SCREW.	1
3	PAFZZ	10988	A34471	BOLT,SHOULDER.........................	2
4	PAFZZ	96906	MS9226-07	WIRE,NONELECTRICAL....................	1
5	XBHZZ	10988	L102648	MAST WELDMENT, INNER................	1
6	XBHZZ	10988	L102677	MAST WELDMENT, OUTER................	1
7	XBOZZ	10988	L103941	PLATE, IDENTIFICATION, PATENT, MAST	1
8	XBOZZ	10988	168-73	SCREW, DRIVE..........................	2
9	PAFZZ	96906	MS35338-51	WASHER,LOCK...........................	4
10	PAFZZ	10988	L101751	PLUG,MACHINE THREAD...................	4
11	PAFZZ	10988	L107964	WASHER,FLAT...........................	4
12	PAFZZ	10988	L102732	PULLEY,FLAT CHAIN.....................	6
13	PAFZZ	43334	U5206TM	.BEARING,ROLLER,CYLI..................	1
14	XAFZZ	10988	L102674	.PULLEY, CHAIN NHA NSN 3020-01-161-7799..................................	1
15	PAFZZ	10988	L101725	CHAIN,ROLLER..........................	2
16	PAOZZ	96906	MS35691-1	NUT,PLAIN,HEXAGON.....................	2
17	PFFZZ	10988	L102599	BAR,PULLEY............................	2
18	XBOZZ	11897	101-BB-1113	BUMPER, HOSE..........................	4
19	PAFZZ	10988	L104197	WASHER,FLAT...........................	2
20	PAOZZ	96906	MS90725-19	SCREW,CAP,HEXAGON H...................	2
21	PAFZZ	96906	MS35338-46	WASHER,LOCK...........................	4
22	PAOZZ	10988	61-616	SCREW,CAP,SOCK PART OF KIT P/N L36258 S/N 9150573 AND ABOVE	2
24	PFOZZ	10988	L111276	PULLEY.GROOVE PART OF KIT P/N L36258	2
25	PAFZZ	10988	AA839-4	BEARING, SLEEVE	2
26	PAFZZ	96906	MS27183-23	WASHER,FLAT...........................	10
27	PAFZZ	10988	L102687	BOLT,SHOULDER.........................	2
28	PAFZZ	92563	CFH-13/4-SB	CAM,ROLLER............................	4
29	PBHZZ	10988	L101909	CARRIAGE ASSY MAST CARRIAGE BEARING	1
30	PAHZZ	96906	MS16997-169	SCREW,CAP,SOCKET HE...................	36
31	PAFZZ	10988	L101844	SHIM,BEARING..........................	26
32	PAFZZ	06388	MG307FF	BEARING,BALL,ANNULA...................	10
33	PBHZZ	32828	T7-11P2	BEARING,BALL,ANNULA...................	1
34	PAFZZ	55880	BL534	CHAIN,LEAF SHIFT......................	1
35	PAFZZ	10988	L102797	SPACER, CHAIN PULLEY..................	2
36	PAFZZ	10988	195-2112	WASHER,FLAT...........................	8
37	PAFZZ	96906	MS51967-23	NUT,PLAIN,HEXAGON.....................	2
38	PAFZZ	96906	MS90725-192	SCREW,CAP,HEXAGON H...................	2
39	PAFZZ	96906	MS90726-107	SCREW,CAP,HEXAGON H...................	2
40	PAFZZ	96906	MS35338-48	WASHER,LOCK...........................	2
41	XBFZZ	10988	L101888	STRAP, CYLINDER MOUNTING..............	1
42	XDFZZ	79136	5160-137MF	RING,RETAINING........................	1
43	PAFZZ	10988	L102738	PIN,TAPERED,THREADE CYLINDER.......	1
44	PBHZZ	10988	L102688	FRAME,SIDE,SHIFT WELDMENT..........	1
45	PAFZZ	96906	MS35338-53	WASHER,LOCK...........................	1
46	PAFZZ	10988	131-1333	NUT,SELF-LOCKING HE...................	1
47	PAFZZ	79136	5160-118	RING,RETAINING........................	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
48	PAFZZ	96906	MS24665-281	PIN,COTTER	16
49	PAFZZ	10988	L102604	PIN,STRAIGHT,HEADLE	8
50	PAFZZ	10988	L101902	BOLT,CLEVIS	8
51	PAFZZ	10988	L101727	CHAIN,ROLLER SHIFT	1
52	PAOZZ	96906	MS51922-37	NUT,SELF-LOCKING,HE	4
53	XBHZZ	10988	L101919	CARRIAGE ASSEMBLY	1
54	PAHZZ	10988	D38774	.RING,RETAINING	2
55	PAHZZ	10988	L101801	.BEARING,SLEEVE SUPPORT	2
56	XBHZZ	10988	L101879	.CARRIAGE WELDMENT	1
57	PAOZZ	96906	MS15003-6	FITTING,LUBRICATION	1
58	PAHZZ	96906	MS90725-70	SCREW,CAP,HEXAGON H	1
59	PAOZZ	10988	L101450	FORK,LIFT TRUCK	1
60	PAHZZ	96906	MS51922-17	NUT,SELF-LOCKING,HE	1
61	XBHZZ	10988	L101792	BAR, FORK TRAVEL	1
62	XBHZZ	10988	L101948	BAR, CARRIAGE TRAVEL	1
63	XBHZZ	10988	L103776	RETAINER, BAR	1
64	PAHZZ	96906	MS35338-46	WASHER,LOCK	4
65	PAHZZ	96906	MS90725-62	SCREW,CAP,HEXAGON H	4
66	PAFZZ	96906	MS16997-57	SCREW,CAP,SOCKET HE	2
67	PAHZZ	10988	D-43831	SPRING,HELICAL COMP	1
68	PAHZZ	10988	138-56	PIN,HOLLOW	1
69	PAHZZ	10988	L104019	RETAINER,HELICAL CO	1
70	PAHZZ	10988	L104018	PIN,GROOVED,HEADED	1
71	PAFZZ	96906	MS16624-1150	RING,RETAINING	1
72	PAHZZ	10988	196-60	WASHER,FLAT	2
73	PAHZZ	10988	196-75	WASHER,FLAT	2
74	PAFZZ	96906	MS51922-83	NUT,SELF-LOCKING,HE	2
75	PAOZZ	96906	MS15003-1	FITTING,LUBRICATION	2
76	PAHZZ	10988	L74168	SHAFT,SHOULDERED PIVOT	2
77	PFHZZ	10988	L105181	CHANNEL, HOSE, RH	1
78	PBHZZ	10988	L105183	CHANNEL,CENTER,MA HOSE	1
79	PBHZZ	10988	L105182	CHANNEL,HOSE,LH	1
80	XBHZZ	10988	138-159	PIN, ROLL	3
81	PAHZZ	88044	AN365-420A	NUT,SELF-LOCKING,HE	3
82	PAHZZ	96906	MS27183-11	WASHER,FLAT	6
83	PAHZZ	96906	MS90725-14	SCREW,CAP,HEXAGON H	3
84	PAFZZ	10988	L104387	SPACER,SLEEVE	2
85	PAFZZ	10988	196-20	WASHER,FLAT	4
86	PAHZZ	96906	MS51967-20	NUT,PLAIN,HEXAGON	20
87	PAHZZ	10988	196-20	WASHER,FLAT	20
88	PAHZZ	10988	164-226	SCREW,CAP,HEXAGON H	20
89	PAFZZ	96906	MS27183-4	WASHER,FLAT	4
90	PAFZZ	10988	L103962	SPACER,RING CYLINDER	2
91	PAFZZ	10988	D-26918	RING,RETAINING	2
92	PAOZZ	10988	L111421	GUARD,MECH SERIAL NO.9150573 AND ABOVE PART OF KIT P/N L36259	1
93	PAOZZ	10988	95-6	WASHER,SPECIAL PART OF KIT P/N L36259 SERIAL NO.9150573 AND ABOVE	4
94	PAOZZ	10988	92-6	WASHER,LOCK PART OF KIT P/N L36259 SERIAL NO.9150573 AND ABOVE	4
95	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H PART OF KIT P/N L36259	4

END OF FIGURE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QUAD RING
SEAL RING
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ELASTIC SQUARE RING
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Figure 92. Lift cylinder assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2405 HYDRAULIC MAST CLOUMN	
				FIG. 92 LIFT CYLINDER ASSEMBLY	
	PAFFF	10988	G107906	CYLINDER ASSEMBLY,A..................	1
1	XAFZZ	10988	G103221	.END CAP ASSEMBLY....................	1
2	PAFZZ	10988	A41491	..BLEEDER VALVE,HYDRA................	1
3	XAFZZ	10988	G103222	..CAP, END...........................	1
4	PAFZZ	10988	G102569	..PLUG,EXPANSION.....................	1
5	KFFZZ	10988	G103223	..RING, BACKUP.................... PART OF KIT P/N G107912.	1
6	KFFZZ	10988	T11032	..O-RING PART OF KIT............... P/N G107912........................	1
7	PAFZZ	10988	G103216	.CYLINDER,TUBE.......................	1
8	PAFZZ	96906	MS16624-1350	.RING,RETAINING......................	2
9	AFFFF	10988	G103217	.PISTON ASSEMBLY ASSEMBLE FROM PARTS KIT,P/NG107912&PISTON,P/NG103218....	1
10	KFFZZ	10988	G103284	..RING, WEAR PART OF KIT.. P/N G107912	2
11	XCFZZ	10988	G101994	SEAL REPLACED BY P/N L36272........	1
12	XCFZZ	10988	G101995	RING,LOADER REPLACED BY P/N L36272.	1
13	KFFZZ	10988	G32126	..RING, BACKUP PART OF KIT P/N G107912.	2
14	PAFZZ	10988	G15457	..PACKING,PREFORMED................. PART OF KIT P/N G107912....	1
15	PFFZZ	10988	G103218	..PISTON,LINEAR ACTUA...............	1
16	AFFZZ	10988	G103461	.GLAND ASSEMBLY ASSEMBLE FROM KIT G107912............................	1
17	KFFZZ	10988	S92653	..WIPER .... PART OF KIT P/N G107912.	1
18	KFFZZ	10988	G102569	..PLUG,PIPE .... PART OF KIT P/N G107912............	1
19	PFFZZ	10988	G103213	..RETAINER,OIL SEAL..................	1
20	KFFZZ	10988	G103214	..BEARING .... PART OF KIT P/N G107912.	1
21	KFFZZ	10988	S220044	..SEAL PART OF KIT P/N G107912	1
22	KFFZZ	10988	S64595	..RING, BACKUP .... PART OF KIT P/N G107912.	1
23	KFFZZ	10988	G102085	..O-RING .... PART OF KIT P/N G107912.	1
24	XAFZZ	10988	G103208	.TUBE, OUTER, WELD...................	1
25	AFFZZ	10988	G103285	.RING ASSEMBLY ASSEMBLE FROM KIT G107912............................	1
26	KFFZZ	10988	S92653	..WIPER .... PART OF KIT P/N G107912.	1
27	XBFZZ	10988	G103286	..RING...............................	1
28	AFFZZ	10988	G103462	.GLAND ASSEMBLY ASSEMBLE FROM PARTS KIT,NSN,304001K258457&GLAND,P/N,G103	1
29	KFFZZ	10988	G103481	..WIPER	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				P/N G107912 PART OF KIT P/N G107912.	
30	PFFZZ	10988	G103480	..RETAINER,OIL SEAL.................	1
31	KFFZZ	10988	G102569	..PLUG...............PART OF KIT P/N. G107912	1
32	KFFZZ	10988	G103482	..BEARING PART OF KIT PART OF KIT P/N G107912 PART OF KIT P/N G107912.	1
33	KFFZZ	10988	G103483	..SEAL .... PART OF KIT P/N G107912....	1
34	KFFZZ	10988	G103223	..RING,BACKUP PART OF KIT P/N..... G107912	1
35	KFFZZ	10988	T11032	..O-RING............................ PART OF KIT P/N G107912.	1
36	PAFZZ	10988	G103475	.SHAFT,SHOULDERED....................	1
37	KFFZZ	10988	G100449	.RING,WEARING PART OF KIT P/N...... G107912	2

END OF FIGURE

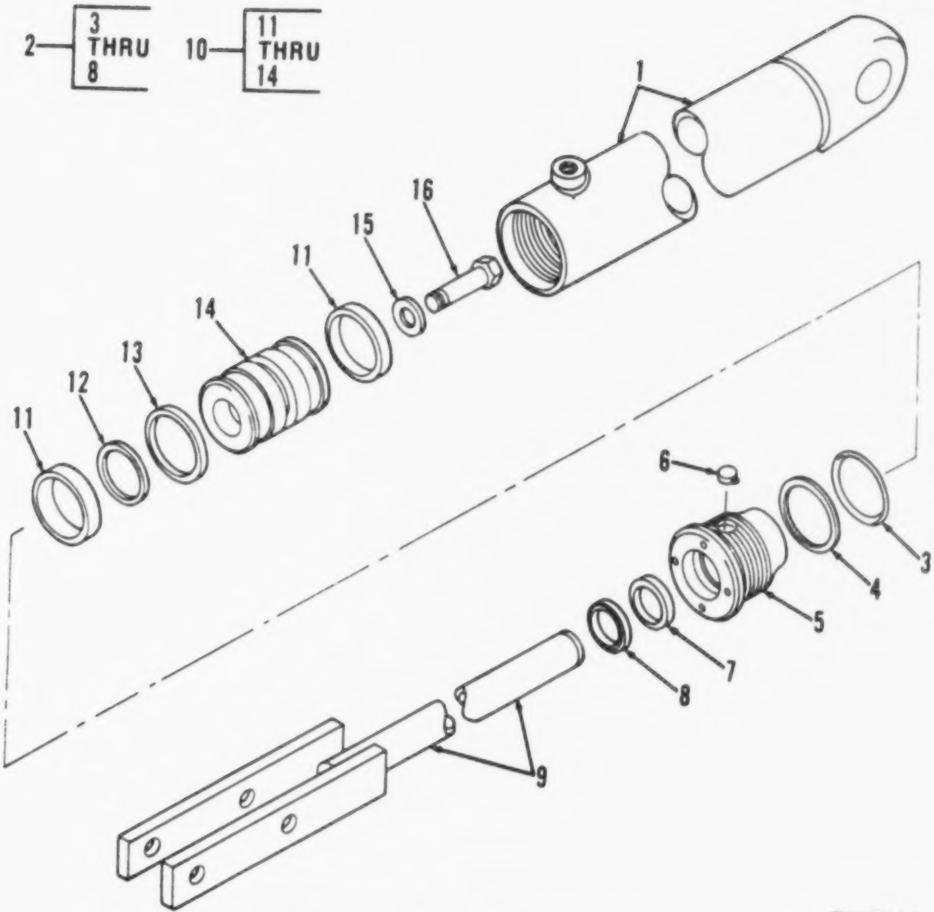
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Figure 93. Sideshift cylinder assembly.

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(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2045 HYDRAULIC MAST COLUMN	
				FIG. 93 SIDESHIFT CYLINDER ASSEMBLY	
	PAFFF	10988	G103232	CYLINDER ASSEMBLY,A SIDESHIFT	1
1	XBFZZ	10988	G103233	.TUBE	1
2	PFFZZ	10988	G103568	.STUFFING TUBE	1
3	KFFZZ	10988	A28318	..SEAL,RING PART OF KIT P/N G102407.	1
4	KFFZZ	10988	G32129	..RING, BACKUP PART OF KIT P/N G102407	1
5	XAFZZ	10988	G103255	..GLAND (NSS)	
6	PAFZZ	10988	G102569	..PLUG,EXPANSION	1
7	KFFZZ	10988	D95141	..WIPER PART OF KIT P/N G102407	1
8	KFFZZ	10988	D36968	..PACKING,PREFORMED PART OF KIT P/N G102407	1
9	PAFZZ	10988	G103238	.CLEVIS,ROD END	1
10	XBFZZ	10988	G100707	.PISTON NSS	1
11	KFFZZ	10988	G100714	..RING, WEAR PART OF PART OF KIT P/N G102407	1
12	KFFZZ	10988	G100713	..RING, SEAL LOADER PART OF KIT P/N G102407 PART OF KIT P/N G102407	1
13	PAFZZ	10988	G102289	..PACKING,PREFORMED	1
14	XBFZZ	10988	G100708	..PISTON	1
15	PAFZZ	10988	G32317	.WASHER,FLAT	1
16	PAFZZ	96906	MS90727-189	.SCREW,CAP,HEXAGON H	1

END OF FIGURE

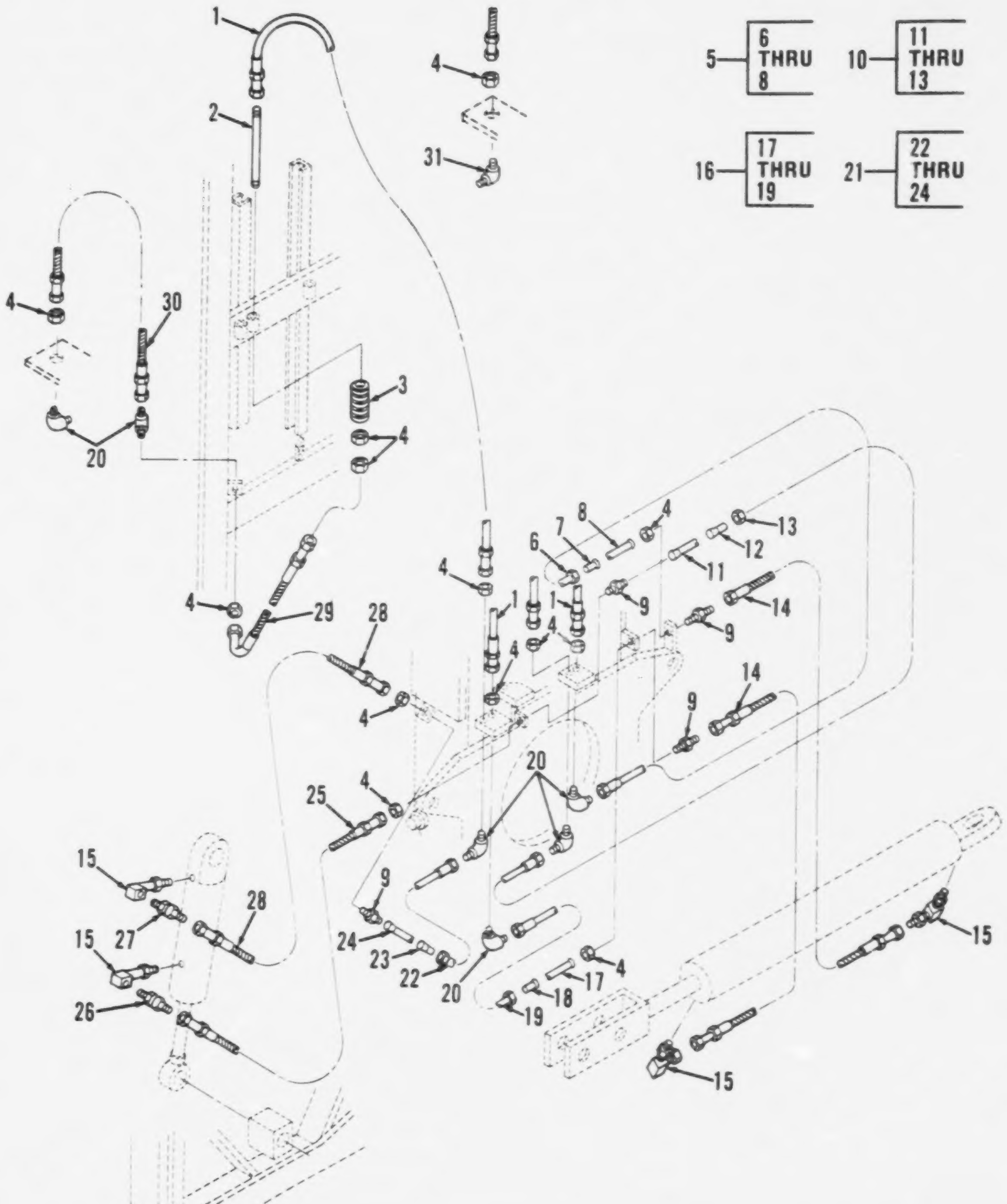
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Figure 94. Mast and carriage hoses, lines and fittings (serial numbers 9150572 and below) (sheet 1 of 2).

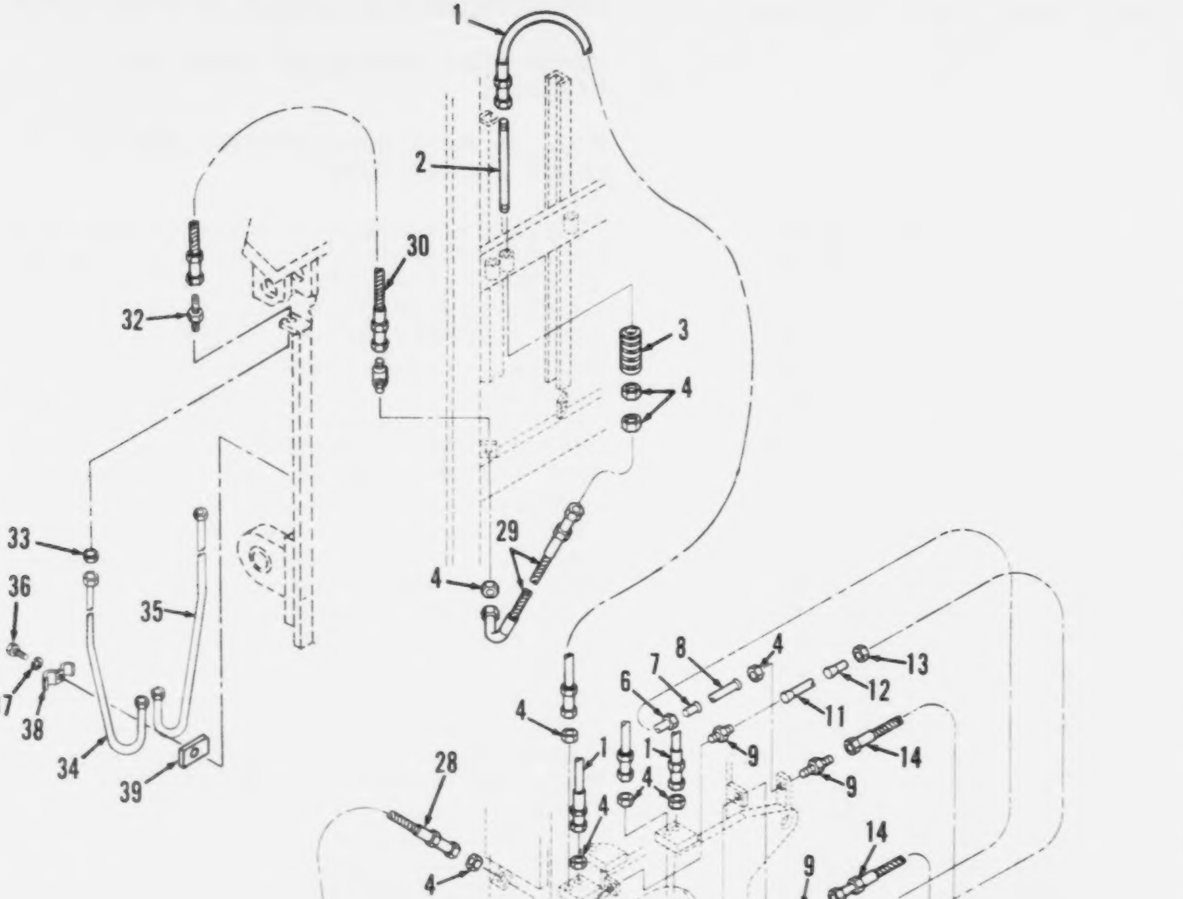
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Figure 94. Mast and carriage hoses, lines and fittings (serial numbers 9150573 and above) (sheet 2 of 2).

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2406 HYDRAULIC LINES AND FITTINGS	
				FIG. 94 MAST AND CARRIAGE HOSES, LINES AND FITTINGS	
1	PAOZZ	10988	L102649	HOSE,ASSY,NONMETALL..................	4
2	PAOZZ	10988	L102605	PIN,HOLLOW,THREADED..................	4
3	PAOZZ	10988	177GD	SPRING,HELICAL,CO....................	4
4	PAOZZ	10988	218-1253	LOCKNUT,BULKHEAD AD..................	24
5	PFOZZ	10988	L102695	TUBE ASSEMBLY,METAL SHIFT..........	1
6	XAOZZ	10988	218-342	.NUT...............................	2
7	XAOZZ	10988	218-362	.SLEEVE............................	2
8	XAOZZ	10988	L102694	.TUBE..............................	1
9	PAOZZ	96906	MS51520A5	NIPPLE,TUBE STRAIGHT...............	4
10	PFOZZ	10988	L102764	TUBE ASSEMBLY,METAL ROTATION.......	1
11	XAOZZ	10988	L102763	.TUBE..............................	1
12	XAOZZ	10988	218-362	.SLEEVE............................	2
13	XAOZZ	10988	218-342	.NUT...............................	2
14	PAOZZ	10988	L102751	HOSE ASSY,NONMETALL..................	2
15	PAOZZ	10988	218-5127	ELBOW,SWIVEL FLANGE..................	4
16	PFOZZ	10988	L102766	TUBE ASSEMBLY,METAL SHIFT..........	1
17	XAOZZ	10988	L102765	.TUBE..............................	1
18	XAOZZ	10988	218-362	.SLEEVE............................	2
19	XAOZZ	10988	218-342	.NUT...............................	2
20	PAOZZ	96906	MS51507-A5	ELBOW,TUBE...........................	10
21	PFOZZ	10988	L102712	TUBE ASSEMBLY,METAL ROTATION.......	1
22	XAOZZ	10988	218-342	.NUT...............................	2
23	XAOZZ	10988	218-362	.SLEEVE............................	2
24	XAOZZ	10988	L102711	.TUBE..............................	1
25	PAOZZ	10988	L102754	HOSE ASSY,NONMETALL CYLINDER.......	1
26	PAOZZ	96906	MS51522A5S	ELBOW,SWIVEL FLANGE..................	1
27	PAOZZ	96906	MS51521A5S	ELBOW,TUBE...........................	1
28	PAOZZ	10988	L102753	HOSE ASSY,NONMETALL CYLINDER.......	6
29	PAOZZ	10988	L102749	HOSE ASSY,NONMETALL SPRING TUBE....	4
30	PAOZZ	10988	L102750	HOSE ASSY,NONMETALL OUTER CHANNELS.	4
31	PAOZZ	10988	L104131	ELBOW,PIPE BULKHEAD................	2
32	PAOZZ	10988	L60751	ADAPTER,STRAIGHT................ PART OF KIT P/N L36260.......	4
33	PAOZZ	10988	218-1254	NUT,PLAIN,HEXAGON PART OF KIT...... L36260	4
34	PAOZZ	10988	L60749	TUBE ASSY,METAL PART OF KIT P/N.... L36260	2
35	PAOZZ	10988	L60747	TUBE ASSY,METAL PART OF KIT P/N.... L36260	2
36	PAOZZ	10988	13-512	BOLT,MACHINE PART OF KIT P/N L36260	2
37	PAOZZ	10988	92-5	WASHER,LOCK PART OF KIT P/N L36260.	2
38	PAOZZ	10988	A12032	STRAP,RETAINING PART OF KIT P/N ... L36260	2
39	PAOZZ	10988	D39023	NUT,SPACER,PLA PART OF KIT P/N	2
				L36260 PART OF KIT P/N L36260........	1

END OF FIGURE

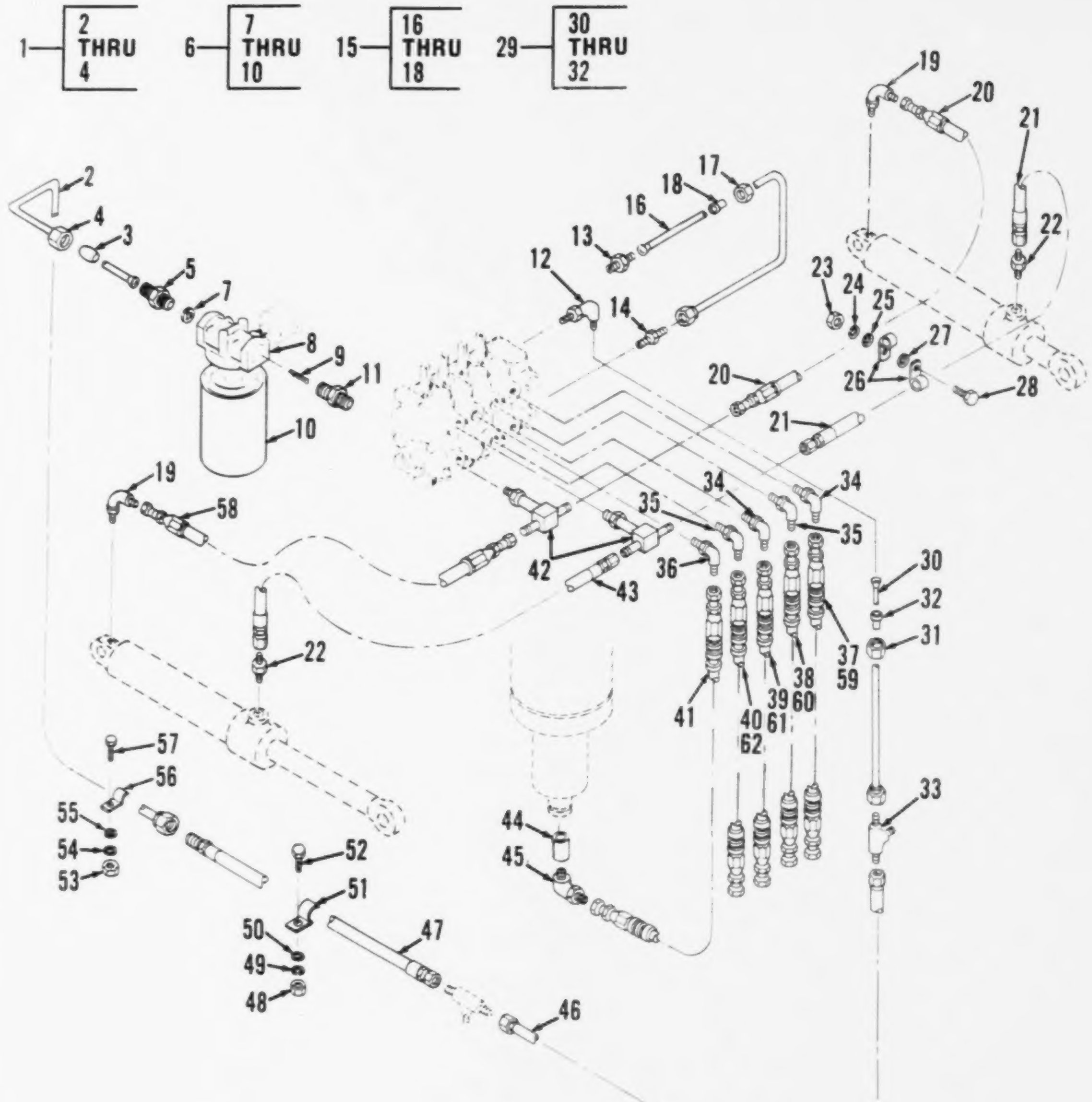
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Figure 95. Hydraulic filter assembly and hoses, lines and fittings.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2406 HYDRAULIC LINES AND FITTINGS	
				FIG. 95 HYDRAULIC FILTER ASSEMBLY AND HOSES, LINES AND FITTINGS	
1	PFOZZ	10988	L103389	TUBE ASSEMBLY,METAL RETJRN.........	1
2	XAOZZ	10988	L103388	.TUBE, RETURN........................	1
3	PAOZZ	10988	218-366	.SLEEVE,FLARED,TUBE..................	2
4	PAOZZ	10988	218-346	.NUT,TUBE COUPLING...................	2
5	PAOZZ	10988	218-5043	ADAPTER,STRAIGHT,TU FILTER TO TUBE.	1
6	AOOZZ	02249	FS-251-2AOG	FILTER ASSEMBLY, HYDRAULIC OIL RETURN............................	1
7	PAOZZ	02249	7510-001	.PARTS KIT,SAFETY RE.................	1
8	XAOZZ	02249	7507-004	.HEAD ASSEMBLY, FILTER.............	1
9	PAOZZ	02249	K23025	.SPRING,HELICAL,COMP.................	1
10	PAOZZ	10988	D80538	.FILTER ELEMENT,FLUI.................	1
11	PAOZZ	10988	218-5072	ADAPTER,STRAIGHT FILTER TO TANK....	1
12	PAOZZ	10988	218-5108	ELBOW,TUBE TO BOSS CONTROL VALVE RETURN............................	1
13	XBOZZ	10988	218-5360	CONNECTOR, SUPPLY TUBE TO STEERING GEAR..............................	1
14	XBOZZ	10988	218-5063	ADAPTER,STRAIGHT,TU TUBE TO CONTROL VALVE............................	1
15	PFOZZ	10988	L103223	TUBE ASSEMBLY,METAL CONTROL VALVE SUPPLY............................	1
16	XAOZZ	10988	L103222	.TUBE................................	1
17	XAOZZ	10988	218-345	.NUT,TUBE COUPLING...................	2
18	XAOZZ	10988	218-365	.SLEEVE..............................	2
19	PAOZZ	10988	218-5625	ELBOW,TUBE...........................	2
20	PAOZZ	10988	L103367	HOSE ASSY,NONMETALL CYLINDER.......	1
21	PAOZZ	10988	L103508	HOSE ASSY,NONMETALL CYLINDER.......	1
22	PAOZZ	10988	218-5045	ADAPTER,STRAIGHT,TU..................	2
23	PAOZZ	96906	MS51967-5	NUT,PLAIN,HEXAGON....................	1
24	PAOZZ	96906	MS35338-45	WASHER,LOCK..........................	1
25	PAOZZ	96906	MS27183-13	WASHER,FLAT..........................	1
26	PAOZZ	75272	COV1113	CLAMP,LOOP...........................	2
27	PAOZZ	10988	D-33552	SPACER,SLEEVE........................	1
28	PAOZZ	96906	MS90728-38	BOLT,MACHINE.........................	1
29	PFOZZ	10988	L103285	TUBE ASSEMBLY,METAL CONTROL VALVE RETURN............................	1
30	XAOZZ	10988	L103284	.TUBE................................	1
31	PAOZZ	10988	218-346	.NUT,TUBE COUPLING...................	2
32	PFOZZ	10988	218-366	.SLEEVE,FLARED,TUBE..................	2
33	PAOZZ	10988	218-596	TEE,TUBE.............................	1
34	PAOZZ	10988	218-5274	ELBOW,TUBE TO BOSS...................	4
35	PAOZZ	10988	218-5281	ELBOW,SWIVEL FLANGE..................	2
36	PAOZZ	10988	218-5107	ELBOW................................	1
37	PAOZZ	10988	L103366	HOSE ASSY,NONMETALL ROTATE AND SIDE SHIFT............................	1
38	PAOZZ	10988	L104133	HOSE ASSY,NONMETALL..................	1
39	PAOZZ	10988	L103365	HOSY ASSY,NONMETALL ROTATE AND SIDE	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				SHIFT................................	
40	PAOZZ	10988	L104132	HOSE ASSY,NONMETALL.................	1
41	PAOZZ	10988	L103368	HOSE ASSY,NONMETALL.................	1
42	PAOZZ	10988	L103506	TEE,PIPE TO TUBE....................	2
43	PAOZZ	10988	L103512	HOSE ASSY,NONMETALL CYLINDER.......	1
44	PAFZZ	58143	20102-012-7.0	RESTRICTOR,FLUID FL................	1
45	PAFZZ	10988	218-5119	ELBOW,TUBE TO BOSS..................	1
46	PAOZZ	10988	L103339	HOSE ASSY,NONMETALL CONTROL VALVE RETURN................................	1
47	PAOZZ	10988	L103338	HOSE ASSY,NONMETALL SYSTEM RETURN..	1
48	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON..................	1
49	PAOZZ	96906	MS35338-46	WASHER,LOCK.........................	1
50	PAOZZ	96906	MS27183-15	WASHER,FLAT.........................	1
51	XBOZZ	10988	L58147	CLAMP, HOSE.........................	1
52	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H................	1
53	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON..................	1
54	PAOZZ	96906	MS35338-46	WASHER,LOCK.........................	1
55	PAOZZ	96906	MS27183-15	WASHER,FLAT.........................	1
56	XBOZZ	10988	L25930	CLAMP, TUBE.........................	1
57	PAOZZ	96906	MS18154-60	SCREW,CAP,HEXAGON H................	1
58	PAOZZ	10988	L103364	HOSE ASSY,NONMETALL CYLINDER.......	1
59	PAOZZ	10988	L111151	HOSE ASSY,METALLIC PART OF KIT P/N. L36260 SERIAL NO.9150573 AND ABOVE	1
60	PAOZZ	10988	L111149	HOSE ASSY,METALLIC PART OF KIT P/N. L36260 SERIAL NO.9150573 AND ABOVE	1
61	PAOZZ	10988	L111152	HOSE ASSY,METAL PART OF KIT P/N .... L36260 SERIAL NO.9150573 AND ABOVE	1
62	PAOZZ	10988	L111150	HOSE ASSY,METAL PART OF KIT P/N .... L36260 SERIAL NO.9150573 AND ABOVE	1

END OF FIGURE

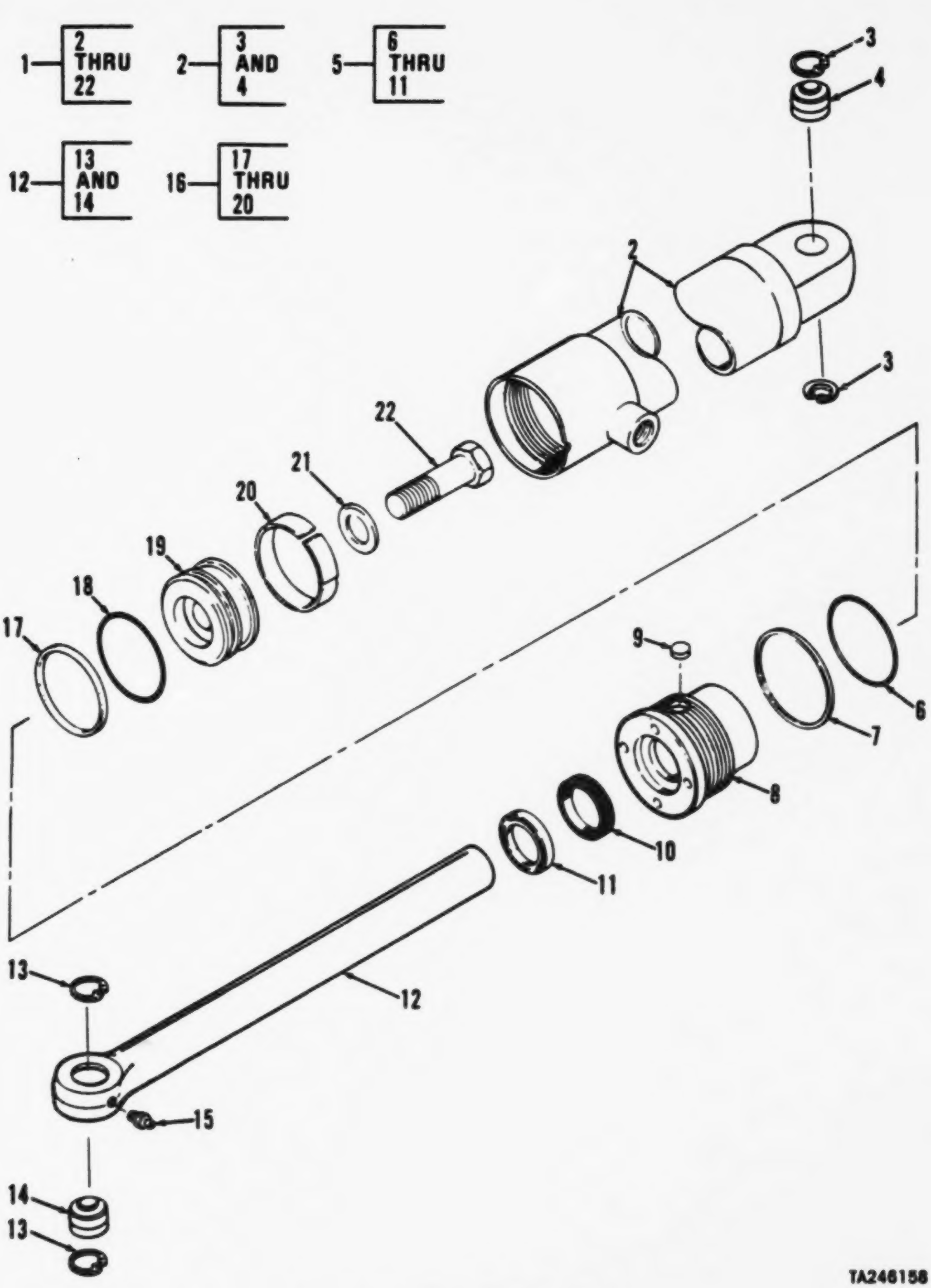
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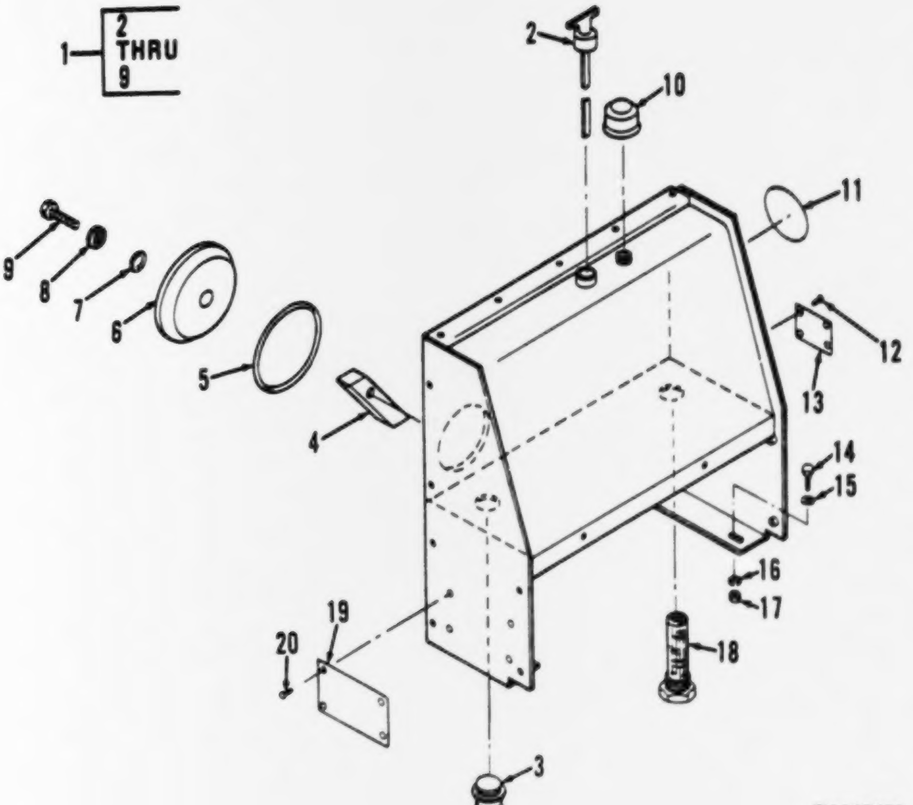
Figure 96. Rotation cylinder assembly.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2407 HYDRAULIC CYLINDERS	
				FIG. 96 ROTATION CYLINDER ASSEMBLY	
1	PAFFH	10988	G103241	CYLINDER,ACTUATING ROTATION........	1
2	XBFZZ	10988	G103242	.TUBE................................	1
3	PAFZZ	96906	MS16625-1200	..RING,RETAINING....................	2
4	PAFZZ	51588	B20-L	..BEARING,PLAIN,SELF-...............	1
5	XBFZZ	10988	G103569	.GLAND ASSEMBLY......................	1
6	KFFZZ	10988	A28318	..SEAL,RING PART OF KIT P/N G35378..	1
7	KFFZZ	10988	G32129	..RING, BACKUP PART OF KIT P/N G35378............................	1
8	XBFZZ	10988	G103257	..GLAND..............................	1
9	PAFZZ	10988	G102569	..PLUG,EXPANSION....................	1
				O-RING PART OF KIT (1) 96-18	
10	KFFZZ	10988	G33955	..WIPER PART OF KIT P/N. G35378............................	1
11	KFFZZ	10988	G35372	..SEAL PART OF KIT P/N G35378............................	1
12	PAFZZ	10988	G103247	.CONNECTOR,ROD END...................	1
13	PAFZZ	96906	MS16625-1200	..RING,RETAINING....................	2
14	PAFZZ	51588	B20-L	..BEARING,PLAIN,SELF-...............	1
15	PAFZZ	96906	MS15003-1	.FITTING,LUBRICATION LUBRICATION...	2
16	XAFZZ	10988	G35269	.PISTON (NSS)........................	1
17	KFFZZ	10988	G33140	..RING, SEALING PART OF KIT... P/N G35378........................	1
18	KFFZZ	10988	F62076	..O-RING PART OF KIT P/N G35378............................	1
19	XBFZZ	10988	G34804	..PISTON............................	1
20	KFFZZ	10988	G100714	..RING, WEAR PART OF KIT P/N G35378............................	1
				RING, BACKUP PART (1) 96-7	
21	PAFZZ	79807	15000	.WASHER,FLAT.........................	1
22	PAFZZ	96906	MS90727-113	.SCREW,CAP,HEXAGON H................	1

END OF FIGURE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TA127493

Figure 97. Hydraulic tank.

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 2408 LIQUID TANKS OR RESERVOIR	
				FIG. 97 HYDRAULIC TANK	
1	XBFFF	10988	L101773	HYDRAULIC TANK, WELDED..............	1
2	PAOZZ	10988	L101877	.GAGE ROD-CAP,LIQUID TANK...........	1
3	PAOZZ	10988	221-677	.PLUG,PIPE,MAGNETIC.................	1
4	XBOZZ	10988	L77125	.BAR, HOLD-DOWN.....................	1
5	PAOZZ	10988	A27410	.PACKING,PREFORMED..................	1
6	XBOZZ	10988	L77124	.COVER, HYDRAULIC TANK..............	1
7	PAOZZ	02697	2-442N674-70	.PACKING,PREFORMED..................	1
8	PAOZZ	10988	L78045	.WASHER,RECESSED....................	1
9	PAOZZ	10988	113-695	.SCREW,CAP,HEXAGON H................	1
10	PAOZZ	91561	7312-009	FILTER ELEMENT,FLUI TANK............	1
11	XBOZZ	10988	L104298	DECAL, STAR.........................	2
12	XBOZZ	10988	151-544	RIVET, POP..........................	4
13	XBOZZ	10988	L103944	PLATE, IDENTIFICATION, COLD START..	1
14	PAOZZ	96906	MS90725-64	SCREW,CAP,HEXAGON H................	4
15	PAOZZ	96906	MS27183-15	WASHER,FLAT........................	4
16	PAOZZ	96906	MS35338-46	WASHER,LOCK........................	4
17	PAOZZ	96906	MS51967-8	NUT,PLAIN,HEXAGON..................	4
18	PAOZZ	55524	S-24-100	STRAINER ELEMENT,SE................	1
19	XBOZZ	10988	L104941	PLATE, IDENTIFICATION..............	1
20	XBOZZ	10988	151-544	RIVET, POP.........................	4

END OF FIGURE

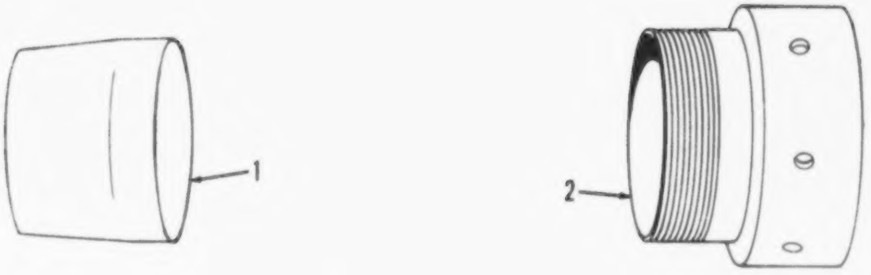

Figure 98. Special tools.

1. Insertion Sleeve, External Taper
2. Insertion Sleeve, Internal Taper

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	QTY
				GROUP 26 TOOLS AND TEST EQUIPMENT	
				GROUP 2604 SPECIAL TOOLS	
				FIG. 98 SPECIAL TOOLS INSERTION SLEEVE	
1	PFFZZ	45225	CAS-1704-2	SLEEVE,INTERNAL TAP PART OF KIT P/N CAS-1704..	1
2	PFFZZ	45225	CAS-1704-1	SLEEVE,EXTERNAL TAP PART OF KIT P/N CAS-1704..	1

END OF FIGURE

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY

REPAIR KITS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
	PAFZZ	10988	A44758	GASKET SET...........................	V
				GASKET (1) 11-8	
				GASKET, OIL PAN (1) 11-1	
	PAHZZ	10988	A151892	RING SET,PISTON RE-RING, SET OF 1..	V
				RING, PISTON, TOP (4) 6-1	
				RING, PISTON (4) 6-2	
				RING, PISTON, OIL (4) 6-3	
				SLEEVE,EXTERNAL TAP(1) 98-2	
				SLEEVE,INTERNAL TAP(1) 98-1	
	PAFZZ	70960	DC62N1	SEAL,DUST.............................	V
				CAP (1) 61-17	
				WASHER (2) 61-15	
				WASHER,FLAT (1) 61-16	
	PAFZZ	70960	DC62N1	SEAL,DUST............................	V
				CAP (1) 62-10	
				WASHER (2) 62-8	
				WASHER,FELT (1) 62-9	
	PAFZZ	10988	G34819	PARTS KIT,LINEAR AC.................	V
				O-RING (1) 77-11	
				O-RING (1) 77-17	
				PACKING,PREFORMED (1) 77-8	
				RING, SEAL (1) 77-16	
				RING, WEAR (1) 77-19	
				SEAL (1) 77-10	
				WIPER (1) 77-9	
	PAFZZ	10988	G102404	PARTS KIT,LINEAR AC..................	V
				BEARING,SLEEVE (1) 90-21	
				GASKET (1) 90-9	
				O-RING (1) 90-18	
				PACKING,PREFORMED (1) 90-19	
				PACKING,PREFORMED (1) 90-17	
				PLUG,EXPANSION (1) 90-20	
				RING,WEARING (2) 90-8	
	PAFZZ	10988	G102407	PARTS KIT,SEALING....................	V
				PACKING,PREFORMED (1) 93-8	
				RING, SEAL LOADER (1) 93-12	
				RING, (1) 93-11	
				SEAL,RING (1) 93-3	
	PAFZZ	10988	G107912	PARTS KIT,LINEAR USE OF SPECIAL TOOL CAS-1704 REQUIRED.............	V
				BEARING (1) 92-20	
				BEARING (1) 92-32	
				O-RING (1) 92-23	
				O-RING (1) 92-6	
				O-RING (1) 92-35	

REPAIR KITS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				PACKING,PREFORMED (1) 92-14	
				PARTS KIT,SCAL........................	V
				PLUG PART OF KIT (1) 92-31	
				PLUG,PIPE (1) 92-18	
				RING, BACKUP (1) 92-22	
				RING, BACKUP (2) 92-13	
				RING, BACKUP (1) 92-5	
				RING, WEAR (2) 92-10	
				RING,BACKUP (1) 92-34	
				RING,WEARING (2) 92-37	
				SEAL (1) 92-21	
				SEAL (1) 92-33	
				WIPER (1) 92-17	
				WIPER (1) 92-29	
				WIPER (1) 92-26	
	PAHZZ	02249	K-6030-A	PARTS KIT,ENGINF PO PLUG..........	V
				PACKING,PREFORMED (1) 87-7	
				PACKING,PREFORMED (1) 87-9	
				PACKING,PREFORMED (1) 88-7	
				PACKING,PREFORMED (1) 88-9	
				PLUG (1) 87-4	
				PLUG (1) 88-4	
				POPPET,VALVE,ENGINE(1) 87-11	
				POPPET,VALVE,ENGINE(1) 88-11	
				RING, BACK-UP (1) 87-6	
				RING, BACK-UP (2) 87-8	
				RING, BACKUP (1) 88-6	
				RING, BACK-UP (2) 88-8	
				SEAL, O-RING (1) 87-5	
				SEAL, O-RING (1) 88-5	
				SPRING, POPPET (1) 87-10	
				SPRING, POPPET (1) 88-10	
	PAHZZ	02249	K6032	SEAL KIT CHECK PLUG...............	V
				PACKING,PREFORMED (1) 87-7	
				PACKING,PREFORMED (1) 87-9	
				PACKING,PREFORMED (1) 88-7	
				PACKING,PREFORMED (1) 88-9	
				RING, BACK-UP (1) 87-6	
				RING, BACK-UP (2) 87-8	
				RING, BACKUP (1) 88-6	
				RING, BACK-UP (2) 88-8	
				SEAL, O-RING (1) 87-5	
				SEAL, O-RING (1) 88-5	
	PAHZZ	02249	K-28062	SEAL KIT PLUG......................	V
				PACKING,PREFORMED (1) 86-3	
				PACKING,PREFORMED (1) 86-5	
				WASHER, BACK-UP (2) 86-4	
	PAHZZ	02249	K6035	SEAL KIT,VALVE.....................	V
				RING, BACK-UP (1) 87-22	
				RING, BACK-UP (1) 88-34	
				SEAL (1) 87-23	
				SEAL (1) 88-35	

REPAIR KITS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				CAP-PLUG,PROTECTIVE(1) 87-14	
				CAP-PLUG,PROTECTIVE(1) 88-26	
	PAHZZ	02249	K-6125	PARTS KIT,LINEAR AC POSITIONER.....	V
				COLLAR, SPRING (2) 87-18	
				COLLAR, SPOOL (1) 87-17	
				COLLAR, SPRING (2) 88-30	
				COLLAR, SPOOL (1) 88-29	
				SCREW (2) 87-13	
				SCREW (2) 88-25	
				SCREW,MACHINE (1) 87-15	
				SCREW,MACHINE (1) 88-27	
				SPRING, RETURN (1) 87-19	
				SPRING, RETURN (1) 88-31	
				WASHER,LOCK (1) 87-16	
				WASHER,LOCK (1) 88-28	
	PAOZZ	10988	L36257	PARTS KIT,FLUID PRE PART OF KIT P/N L36257............................	V
	PAOZZ	70040	5651834	FILTER,FLUID FILTER FLUID, PART OF KIT P/N L36257.......................	V
				HOSE,NONMETALLIC (2) 18-5	
	PAOZZ	10988	L36258	PART KIT,PULLY.......................	V
				PULLEY,GROOVE (2) 91-24	
				SCREW,CAP,SOCK (2) 91-22	
	PFFZZ	10988	L36259	PARTS KIT,CYL GUARD.................	V
				GUARD,MECH (1) 91-92	
				SCREW,CAP,HEXAGON H(4) 91-95	
				WASHER,LOCK (4) 91-94	
				WASHER,SPECIAL (4) 91-93	
	PFFZZ	10988	L36260	PARTS KIT,HYDRA......................	V
				ADAPTER,STRAIGHT (4) 94-32	
				BOLT,MACHINE (2) 94-36	
				HOSE ASSY,METAL (1) 95-62	
				HOSE ASSY,METAL (1) 95-61	
				HOSE ASSY,METALLIC (1) 95-59	
				HOSE ASSY,METALLIC (1) 95-60	
				NUT,PLAIN,HEXAGON (4) 94-33	
				NUT,SPACER,PLA (2) 94-39	
				STRAP,RETAINING (2) 94-38	
				TUBE ASSY,METAL (2) 94-35	
				TUBE ASSY,METAL (2) 94-34	
				WASHER,LOCK (2) 94-37	
	PAFZZ	10988	L36272	PARTS KIT,SCAL USE OF SPECIAL TOOL CAS-1704 REQUIRED PART OF KIT P/N G107912............................	V
				BOOT,DUST AND MOIST(1) 71-10	
				O-RING (1) 71-8	
				O-RING (1) 71-20	
				RING, BACK-UP (3) 71-7	
	PAFZZ	92865	02-400-076	PARTS KIT,HYDRAULIC.................	V
				RING, PISTON (1) 71-5	
				RING, RETAINING (1) 71-13	
				SEAL (3) 71-6	

REPAIR KITS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
	PAFZZ	27007	24500-930	REPAIR KIT,HYDRAULI................	V
				BALL,BEARING (2) 75-23	
				DIAPHRAGM (1) 75-18	
				GASKET (1) 75-20	
				GASKET, BACK-UP (1) 75-19	
				O-RING (1) 75-4	
				PACKING,PREFORMED (2) 75-9	
				PLATE,THRUST (1) 75-10	
				SEAL, DIAPHRAGM (1) 75-21	
				SEAL,PLAIN ENCASED (1) 75-30	
				SPRING,HELICAL,COMP(2) 75-22	
	PAHZZ	12603	801979	GASKET SET CONVERTER SECTION.......	V
				GASKET (1) 54-7	
				O-RING (1) 46-36	
				O-RING (1) 46-40	
				PACKING,PREFORMED (1) 54-8	
				PACKING,PREFORMED (1) 46-24	
				RING,PISTON (1) 47-13	
				SEAL RING,METAL (1) 47-7	
				SEAL,PLAIN ENCASED (1) 46-49	
				SPRING,EXPANDER,PIS(1) 47-8	
	PAHZZ	12603	801981	GASKET SET TRANSMISSION SECTION....	V
				CUP,HYDRAULIC BRAKE(1) 55-9	
				GASKET (1) 46-52	
				GASKET (1) 46-22	
				GASKET (1) 49-4	
				GASKET (1) 55-26	
				GASKET (1) 56-9	
				O-RING (1) 48-85	
				O-RING (1) 48-97	
				O-RING (1) 55-6	
				OIL SEAL (1) 48-100	
				PACKING,PREFORMED (2) 49-28	
				PACKING,PREFORMED (1) 49-34	
				PACKING,PREFORMED (1) 49- 29	
				PACKING,PREFORMED (1) 49-2	
				PACKING,PREFORMED (1) 49-24	
				PACKING,PREFORMED (1) 49-26	
				PACKING,PPEFORMED (1) 48-41	
				PACKING,PREFORMED (1) 48-39	
				PACKING,PREFORMED (1) 48-94	
				PACKING,PREFORMED (1) 48-74	
				PACKING,PREFORMED (1) 48-117	
				PACKING,PREFORMED (1) 48-98	
				PACKING,PREFORMED (1) 50-6	
				PACKING,PREFORMED (1) 50-7	
				PACKING,PREFORMED (1) 51-6	
				PACKING,PREFORMED (1) 51-7	
				PACKING,PREFORMED (1) 52-6	
				PACKING,PREFORMED (1) 52-7	
				PACKING,PREFORMED (2) 53-6	
				PACKING,PREFORMED (2) 53-7	

REPAIR KITS

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				PACKING,PREFORMED (4) 56-6	
				RING,PISTON (3) 48-1	
				RING,PISTON (2) 48-57	
				RING,PISTON (3) 48-50	
				SEAL,OIL (1) 55-5	
				SEAL,PLAIN ENCASED (1) 48-79	
				SEAL,PLAIN ENCASED (1) 48-115	
				SEAL,PLAIN ENCASED (1) 55-16	
				SPACER,RING (1) 48-42	
	PAOZZ	55683	818-A151281	FILTER,FLUID......................	V
				FILTER ELEMENT,FLUI(1) 22-5	
				FILTER,ELEMENT,FLUI(1) 22-9	
	GROUP: 99 BULK MATERIALS				
	Fig. BULK				
1	PAOZZ	04963	1099	ADHESIVE........................	1
2	PAHZZ	78500	11990298l	GASKET MATERIAL..................	1
3	XBFZZ	92865	56-001-008	GREASE, SILICONE.................	V
4	PAHZZ	05972	222-21	SEALING COMPOUND CC BOTTLE.........	1
1	PEFFF	45225	CAS-1704	SLEEVE,INSERTION TO...............	
	PAFZZ	10986	A155589	GASKET GRIND......................	1
				GASKET (1) 28-1	
				GASKET (1) 13-1	
				GASKET (1) 13-9	
				GASKET, CYLINDER (1) 3-6	
				GROMMET,METALLIC (2) 7-3	
				PACKING,PREFORMED (1) 28-28	
				SPACER,RING (8) 17-68	
				SPACER,SLEEVE (1) 15-10	
				WASHER,FLAT (1) 15-11	
	PAFZZ	10988	G35378	PARTS KIT, LINEAR AC.	V
				O-RING (1) 96- 18	
				RING, BACKUP (1) 96- 7	
				RING, SEALING (1) 96- 17	
				RING, WEAR (1) 96- 20	
				SEAL (1) 96- 11	
				SEAL, RING (1) 96- 6	
				WIPER (1) 96- 10	
	PAHZ	02249	K-6033	PARTS KIT, SHAFT, HYD	V
				PLATE, SEAL (1) 87- 26	
				SCREW, MACHINE (2) 87- 27	
				SCREW, MACHINE (2) 88- 39	
	PFFZZ	45225	CAS-1704-2	SLEEVE, INTERNAL TAP	
				PART OF SET P/N CAS-1704 (1) 98- 1. . . .	V
				PART OF KIT P/N CAS-1704 (1) 98- 1	
	PFFZZ	45225	CAS-1704-1	SLEEVE, EXTERNAL TAP	
				PART OF SET P/N CAS-1704 (1) 98-2.	V
				PART OF KIT P/N CAS-1704 (1) 98-2	

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) REPAIR KITS DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
	PAOZZ	78500	Kit9112	Parts Kit, Brake	V
				Pin, Straight (2) 69-4	
				Shoe, Lining (2) 69-5	
				Seat, Helical (4) 69-6	
				Spring, Helical (2) 69-7	
				Spring, Helical Ext (1) 69-8	
				Clip, Retaining (1) 69-9	

(NSN 2530-01-124-8844)
For Above Kit

Kits-6

SECTION III SPECIAL TOOLS AND TEST EQUIPMENT

(1) ILLUSTRATION (a) FIG. NO.	 (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
98	1	PFFZZ	5120-01-220-9440	45225	CAS-1704-2	Sleeve, Internal TAP	1	1
98	2	PFFZZ	5120-01-220-4887	45225	CAS-1704-1	Sleeve, External TAP	1	1

Figure 98-1

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
5330-00-000-0085	87	21
	88	33
2815-00-001-0022	7	14
5930-00-004-3904	34	44
5340-00-005-0917	67	2
5340-00-006-8209	81	27
6210-00-006-9781	34	15
5305-00-007-6061	46	38
5330-00-008-5967	7	8
5340-00-009-5294	19	11
4730-00-010-3875	64	52
	65	13
	66	52
5315-00-012-0123	10	20
6240-00-013-1282	34	5
4730-00-018-9566	47	29
	47	30
	49	9
6240-00-019-0877	38	5
5365-00-020-8588	26	14
5365-00-022-0665	15	10
5310-00-022-0666	15	11
5310-00-026-3037	78	10
5310-00-031-1879	91	93
3110-00-036-6843	74	55
5305-00-042-6417	75	39
	78	8
	79	15
	82	22
5305-00-042-9478	67	19
5305-00-042-9479	91	38
5365-00-043-1503	22	7
5365-00-043-1520	14	22
4730-00-043-4479	19	22
6240-00-044-6914	37	14
5310-00-045-3296	24	12
	24	19
	33	39
	33	45
	33	63
	34	2
	34	66
	40	2
	40	15
	70	15
	82	41
5310-00-045-3299	32	11
	55	27
2520-00-045-4037	49	5
	49	25
5330-00-045-7410	92	14
5305-00-050-1076	49	8
	57	41
4730-00-050-4208	60	6
	61	8
	61	13
	62	1
	62	5
	77	3
	79	16
	91	75
	96	15
5305-00-050-9229	70	16
5305-00-051-0835	82	48
3040-00-051-5225	24	1
2520-00-051-5327	49	32
	49	40
	49	41
2520-00-051-9932	47	2
5305-00-054-6666	55	28
2805-00-054-6923	4	9
2805-00-054-6945	10	
5330-00-054-6962	13	4
	25	11
6140-00-057-2554	42	4
4730-00-057-5555	28	2
2910-00-058-6552	17	27
5330-00-061-8538	17	93
5310-00-067-6356	45	6
	80	6
5310-00-067-9507	63	41
	64	14
	65	41
	66	14
	91	52
5305-00-068-0500	2	4
	5	19
5305-00-068-0502	5	5
	10	26
	32	3
	43	22
	43	26
	43	34
	82	27
5305-00-068-0508	4	12
5305-00-069-5578	47	20
5305-00-069-5583	54	2
5305-00-071-1784	49	12
5305-00-071-1787	34	49
	46	47

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-00-071-1787	70	2	5330-00-097-7721	13	10
5305-00-071-2055	63	4	5330-00-097-7722	13	9
	64	33	5307-00-097-7725	2	16
	65	4	5961-00-099-9791	31	18
	66	33		74	97
5305-00-071-2058	63	2	3110-00-100-0380	63	36
	65	2		65	36
5305-00-071-2064	54	1	3110-00-100-0586	64	41
5305-00-071-2069	63	3		66	41
	65	3	3110-00-100-3095	63	22
5305-00-071-2070	26	25	3110-00-100-3096	64	10
	90	25		66	10
5305-00-071-2072	80	9	3110-00-100-3600	64	43
5305-00-071-2076	57	5		66	43
5305-00-071-2077	57	23	3110-00-100-6151	74	28
5305-00-071-2081	2	31	3110-00-100-6153	74	35
5305-00-071-2232	91	20	3110-00-100-6155	48	78
5305-00-071-2237	91	83	3110-00-100-6159	55	24
5305-00-071-2241	10	3	5310-00-100-6811	11	2
	70	20		11	4
5305-00-071-2510	81	22	5305-00-105-1207	33	40
	81	26		33	53
5977-00-076-9155	33	56	4730-00-105-2684	55	20
5310-00-080-6004	8	26	5310-00-106-9927	6	11
	13	2	5365-00-107-9068	91	47
	13	6	5305-00-110-1533	77	12
5310-00-080-8495	83	17	3120-00-111-2253	79	30
3120-00-086-7895	33	38	3120-00-111-2280	90	6
5310-00-087-4652	13	7	5307-00-111-2300	28	27
	13	17	3120-00-111-8707	2	18
	26	12	5365-00-111-8708	13	15
	30	14		23	1
	91	60	5307-00-111-8709	3	17
5310-00-087-7493	25	19	5935-00-115-2307	43	18
	30	3	5310-00-115-6223	17	118
	57	27	5305-00-115-9526	30	13
	70	10		38	11
	76	13		72	17
	76	67	5330-00-117-0085	61	
	81	13		62	
	82	55	2520-00-118-1436	62	13
	84	2	2530-00-119-3725	92	2
	85	2	5307-00-125-7608	3	12
	95	25	2910-00-127-5073	17	108
5325-00-088-6147	37	2	2910-00-127-5075	17	111
5305-00-088-8332	40	5	2910-00-128-1185	17	20
4710-00-097-7705	14	17	4730-00-131-1423	19	18
4710-00-097-7711	14	21	5315-00-140-1938	70	24
4710-00-097-7712	14	20	3110-00-142-4387	63	26
3020-00-097-7720	5	11		65	26

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STOCK NUMBER	FIG.	ITEM
2520-00-142-5385	47	13
2520-00-142-5392	48	1
	48	57
3110-00-142-7005	48	25
	48	30
	48	59
4730-00-143-3941	76	21
5310-00-143-6145	79	26
	91	74
5305-00-148-3797	60	1
	61	18
	62	12
3040-00-150-7188	24	10
2910-00-155-3194	15	4
2910-00-155-3198	14	16
5310-00-155-4915	20	5
3110-00-155-6741	48	45
5330-00-162-3753	28	8
2940-00-163-4727	19	6
5310-00-167-0680	48	90
	61	5
5310-00-167-0721	74	73
5330-00-171-4595	63	31
	65	31
5330-00-171-5641	17	37
4730-00-172-0022	90	5
4730-00-172-0028	70	21
4730-00-172-0034	61	2
	79	3
	91	57
2815-00-172-1867	9	1
2815-00-172-1869	8	10
2815-00-172-1870	7	13
3130-00-172-4206	8	18
3020-00-172-5619	9	6
4710-00-172-5622	14	19
5330-00-172-7263	71	30
5310-00-178-9612	33	54
5315-00-182-4127	79	23
1040-00-190-0983	19	1
2910-00-192-9259	17	55
2910-00-192-9405	17	54
5310-00-193-7486	17	6
5310-00-194-0607	17	13
	17	46
5310-00-194-9211	10	27
2530-00-195-0154	48	55
4730-00-196-1497	59	2
4730-00-202-8470	49	16
5305-00-207-3984	17	73
5310-00-208-1919	91	81
5310-00-209-0965	34	47
	46	48
	48	36
	48	88
	49	7
	49	13
	54	4
	54	9
	57	40
	70	1
5365-00-209-3148	17	143
5310-00-212-0120	83	9
5999-00-215-4048	74	101A
5305-00-215-7324	48	106
5365-00-215-7421	14	4
4820-00-215-7436	10	16
5340-00-217-9575	69	6
5315-00-217-9576	69	4
5340-00-217-9599	69	9
5360-00-217-9600	69	7
5930-00-220-6716	40	14
4730-00-221-2140	20	15
2815-00-223-4918	7	7
2815-00-223-4925	7	25
2815-00-223-4926	7	11
2815-00-223-4927	7	12
2815-00-223-4929	3	14
2815-00-223-4941	9	3
5305-00-225-3839	18	9
	20	1
	70	3
	70	8
5305-00-225-3843	4	13
5310-00-225-6408	63	48
	65	48
5310-00-225-6409	79	43
5310-00-225-6993	57	9
	57	16
5306-00-225-8496	49	36
	74	90
5306-00-225-8497	23	5
	29	2
	57	43
	59	20
	82	57
5306-00-225-8498	22	10
5306-00-225-8499	25	16
	25	20
	57	34

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5306-00-225-8499	70	17	5305-00-269-3216	8	9
5306-00-225-8503	81	16		32	14
5305-00-225-8507	85	1	5305-00-269-3217	28	30
5306-00-225-8514	42	1	5305-00-269-3219	8	20
5305-00-225-9081	76	11		28	7
	84	1		28	19
5306-00-225-9096	74	75	5305-00-269-3220	8	21
5935-00-226-2713	43	2		24	7
5306-00-226-4823	28	20		28	25
5306-00-226-4831	95	28		30	8
5310-00-235-9653	14	6		91	58
5315-00-236-8357	82	44	5305-00-269-3222	7	9
5305-00-237-8028	74	64		7	20
5315-00-238-1584	10	13	5305-00-269-3223	55	1
4730-00-241-8349	94	27	5305-00-269-3234	46	27
2640-00-242-7619	73	1		68	12
4730-00-248-6728	12		5310-00-269-4040	1	6
4730-00-249-8278	72	5	3110-00-277-0032	91	13
5330-00-250-2156	46	52	6110-00-278-1044	32	13
5305-00-250-5613	17	139	4730-00-278-3380	45	5
5305-00-253-5606	17	101		49	1
5305-00-253-5618	2	5		49	10
5360-00-253-7229	74	95		63	13
5360-00-253-7230	74	96	5365-00-282-1831	48	84
5340-00-254-4639	70	22	2530-00-283-3321	71	10
4730-00-263-2733	72	29	5940-00-283-5280	34	36
5340-00-269-0281	23	11		34	41
5305-00-269-2807	45	16		43	3
5305-00-269-3213	8	25	5310-00-286-3727	64	30
	26	22		66	30
	41	1	4730-00-287-3279	2	1
	44	21	5365-00-288-3996	57	20
	46	1	2815-00-288-4869	7	19
	46	8	4730-00-289-5176	28	29
	71	33	5325-00-291-0812	38	12
	79	8	5305-00-291-8685	24	4
	81	10	3120-00-294-2219	17	82
	82	5	5330-00-297-7106	38	7
	82	7	5315-00-298-1498	60	10
	82	53	5365-00-298-6563	89	2
	91	65	2590-00-307-8856	34	45
5305-00-269-3214	8	22	5307-00-317-2225	8	1
	13	1	5315-00-321-8737	17	42
	25	12	5305-00-333-9535	74	84
	26	27	4730-00-335-2578	72	10
	58	4	5340-00-335-9299	16	1
	59	17		17	148
	82	37	4730-00-335-9315	17	69
	97	14	5360-00-335-9327	17	136
5305-00-269-3215	45	1	2910-00-335-9331	17	103

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
2910-00-336-8032	17	84	5310-00-407-9566	23	6
6220-00-337-6471	38	1		25	14
4730-00-339-0714	23	13		28	21
5340-00-345-2615	59	16		29	3
5310-00-350-2655	37	13		49	35
5330-00-350-6348	74	39		57	28
2940-00-350-9325	12	2		57	48
4730-00-350-9619	19	21		59	19
5330-00-358-0286	11	8		67	11
5360-00-358-8994	48	76		67	20
5310-00-359-1192	63	28		70	11
	63	30		74	89
	65	28		76	14
	65	30		76	66
5310-00-359-1334	63	29		81	12
	65	29		82	39
4730-00-359-2324	7	4		82	56
4730-00-370-2874	95	45		85	17
2590-00-371-3137	74	93		88	28
4330-00-373-1564	22			95	24
5999-00-374-0826	74	94	5310-00-411-5241	63	5
4730-00-377-3358	14	10		64	32
	14	13		65	5
4320-00-383-3817	28	12		66	32
5365-00-386-9554	63	33	5330-00-411-9136	0007	33
	65	33	5330-00-411-9151	90	19
4730-00-391-3735	7	5	5306-00-413-9852	33	50
4710-00-394-2714	14	12	4730-00-414-8354	14	9
4730-00-395-6567	76	1	6105-00-414-8539	33	66
5330-00-395-6586	8	4	5340-00-414-8593	72	19
5307-00-395-6661	8	3	5310-00-414-9746	3	2
3020-00-399-1135	16	4	5340-00-414-9846	72	16
2815-00-399-1148	13	8		76	12
2920-00-399-8296	33	8	5330-00-417-0525	8	8
5310-00-400-8585	17	140	4730-00-420-0828	2	7
2920-00-401-0582	33	35		18	2
5330-00-401-5247	17	149		18	4
5340-00-404-4101	44	29		20	9
5340-00-404-4169	44	26		63	46
	63	45		65	46
	65	45	5365-00-420-3857	46	31
	72	32		46	39
2530-00-405-6764	72	26		79	44
5330-00-405-8947	4	17		91	91
5306-00-407-3737	33	21	5365-00-420-3858	90	28
	33	62	5365-00-420-3860	77	22
4730-00-407-4756	72	24	2910-00-421-9518	14	23
5310-00-407-5575	17	119	5305-00-422-4221	33	55
5315-00-407-6494	81	1	5305-00-425-1983	2	26
5310-00-407-9566	22	11	5340-00-425-6432	24	23

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5340-00-425-6432	44	30	5310-00-462-4134	48	118
5310-00-425-6434	7	2	5330-00-465-2622	27	4
5330-00-427-7230	22	8	2815-00-467-0578	7	28
5940-00-430-7474	74	82	2990-00-468-3986	2	25
4820-00-432-1232	17	88	4730-00-470-6736	14	2
3110-00-432-4596	64	47	5365-00-470-8133	14	5
	66	47	4730-00-471-0151	76	64
5307-00-432-8471	45	14	9905-00-473-6379	17	102
5330-00-433-3808	33	4	5310-00-476-7648	33	20
4730-00-435-9369	13	16	5306-00-479-4126	9	5
	23	2	5315-00-480-4433	4	5
5330-00-439-4995	4	16	5310-00-481-6573	72	27
5310-00-440-9646	9	7	3110-00-483-2254	47	25
5310-00-440-9934	28	18	5330-00-484-1769	11	
3120-00-441-9991	4	4	5310-00-486-2506	7	10
3120-00-441-9993	4	3		7	10
5340-00-448-1795	23	3	2920-00-486-8048	33	31
	43	23	5330-00-487-4368	4	15
3120-00-449-5818	4	2	5360-00-489-8271	7	16
3120-00-449-5819	4	1	5961-00-492-7871	30	10
2815-00-449-8661	7	26		34	21
5330-00-450-1914	72	25		43	8
5365-00-450-4132	8	12		44	13
5365-00-450-4133	8	12	5330-00-492-8856	17	78
5365-00-450-4134	8	12	5340-00-494-7430	24	3
5365-00-450-4135	8	12	5330-00-496-8327	40	8
5305-00-450-5937	33	41	5930-00-503-4884	70	30
4730-00-450-6626	14	1	5330-00-506-3975	17	100
5310-00-451-0115	9	8	5310-00-508-8942	16	2
5330-00-451-0118	10	31	5365-00-508-8945	22	2
5310-00-451-1688	15	8		48	38
5310-00-451-1690	90	2	5365-00-514-0362	48	58
	93	15	5310-00-514-6674	9	4
5310-00-451-1691	83	18	5340-00-518-1440	24	25
5975-00-451-5001	21	1		95	26
	76	26	5310-00-522-5899	64	23
	76	63		66	23
5330-00-455-2666	74	45	2590-00-525-4387	74	91
5340-00-456-5508	19	3	4730-00-535-2187	2	21
	25	2	4730-00-540-2612	72	28
5310-00-458-8452	1	2	5365-00-543-4174	91	54
5360-00-458-8455	7	27	4730-00-544-2407	97	3
4730-00-459-6077	17	35	5940-00-549-9553	74	78
2990-00-459-7135	17	47	5310-00-550-3503	63	34
2990-00-459-7136	17	138		65	34
5365-00-459-9779	10	29	3110-00-554-3184	46	5
5365-00-459-9780	10	30		46	19
5310-00-461-8858	17	4	3110-00-554-3246	48	69
	17	9	3110-00-554-3450	48	82
5310-00-462-4134	48	93	3110-00-554-5304	46	13

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STOCK NUMBER	FIG.	ITEM
3110-00-554-5675	48	10
3110-00-554-5968	48	4
3110-00-554-5972	48	46
5365-00-556-7446	17	49
5307-00-556-9797	3	15
5340-00-558-1033	3	3
5306-00-558-1034	3	5
5306-00-558-1035	3	4
5307-00-558-1820	7	22
5310-00-559-0070	17	7
5306-00-559-5267	3	1
5970-00-561-9511	74	79
	74	98
5935-00-572-9180	37	5
5930-00-574-2151	36	4
	39	5
5305-00-576-0795	46	46
5977-00-578-6495	74	67
5315-00-582-2466	91	68
5310-00-582-5765	17	3
5310-00-582-5965	2	3
	4	11
	5	6
	5	18
	10	4
	18	7
	20	2
	31	2
	32	4
	33	33
	43	24
	43	28
	43	32
	57	18
	70	28
	81	7
	81	9
	81	18
	82	30
5310-00-584-5272	26	24
	39	3
	67	4
	75	38
	78	5
	79	13
	80	8
	82	23
	83	13
	84	7
	90	26
5310-00-584-5272	91	40
5310-00-584-7888	91	9
5310-00-584-7889	91	45
4730-00-591-3405	63	42
	65	42
4730-00-595-0385	20	13
4730-00-595-1078	63	47
	65	47
5310-00-596-5152	31	23
5340-00-598-6653	2	14
2520-00-598-9546	61	7
2520-00-601-2722	60	
5310-00-606-6608	33	28
5315-00-610-5729	57	10
	89	18
5315-00-616-5514	10	11
5315-00-616-5525	9	2
5340-00-617-7909	19	15
5305-00-619-2322	88	27
5305-00-622-9483	33	34
5310-00-627-6128	8	17
5360-00-629-6190	68	6
4730-00-633-1492	14	8
5310-00-637-1204	74	76
5310-00-637-9541	19	14
	24	15
	24	22
	25	6
	25	10
	26	2
	26	19
	27	2
	28	6
	28	24
	30	12
	32	15
	33	18
	37	12
	38	10
	41	3
	44	23
	44	27
	45	2
	45	13
	45	15
	46	2
	46	9
	47	10
	48	80
	55	2

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-637-9541	58	6	5365-00-713-3754	46	12
	59	15	5305-00-716-8192	91	39
	68	11	5305-00-716-8200	61	6
	69	2	5305-00-716-8211	68	13
	71	32	5305-00-719-5221	63	39
	72	15		65	39
	76	77		96	22
	79	7	5365-00-721-4828	77	5
	79	39	5307-00-721-5547	3	11
	81	4	5305-00-724-5913	1	9
	82	2	5305-00-724-5936	1	1
	82	8	5305-00-726-2550	77	21
	82	11	4730-00-729-7087	75	30
	82	15	5310-00-732-0558	7	1
	82	33		8	7
	82	51		8	27
	91	21		13	13
	91	64		16	3
	95	49		19	13
	95	54		24	9
	97	16		24	14
5330-00-641-8282	17	17		24	21
	17	22		25	5
5330-00-641-8283	17	40		25	9
	17	87		26	17
5330-00-641-8286	17	104		28	23
5330-00-641-8291	17	74		33	19
6240-00-643-0687	36	3		37	11
3040-00-646-6810	17	75		41	4
2910-00-646-9727	23	19		44	24
5365-00-661-3768	64	21		44	28
	66	21		45	12
3120-00-661-5133	89	5		58	7
	89	9		59	14
	89	12		72	14
	89	15		76	76
3120-00-661-6764	33	2		79	40
5977-00-675-1765	33	59		81	5
6220-00-678-9046	37	1		82	1
5930-00-683-1628	34	34		82	20
5310-00-689-3877	40	9		82	50
3110-00-691-2511	64	44		95	48
	66	44		95	53
3110-00-691-2512	64	42		97	17
	66	42	5310-00-732-0559	48	81
5360-00-691-7207	17	144	5310-00-732-0560	39	4
5340-00-693-4175	37	6		63	15
6220-00-695-1107	37	8		65	15
5305-00-709-8539	5	13	5340-00-732-0642	37	9
4730-00-710-5571	59	9		38	4

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STOCK NUMBER	FIG.	ITEM
5360-00-733-9948	69	8
5330-00-735-1272	74	65
5310-00-735-1273	74	100
5310-00-735-3544	19	8
5305-00-737-5694	38	3
2920-00-741-9792	33	5
5360-00-751-8916	17	113
5315-00-752-1651	63	11
	65	11
5365-00-752-1779	64	50
	66	50
5305-00-752-5938	37	10
6220-00-752-6018	38	2
5315-00-754-0848	57	37
5330-00-757-1680	17	124
5330-00-757-7545	28	28
2530-00-758-0039	69	10
5330-00-760-3149	86	8
5310-00-761-6882	18	6
	43	25
	43	29
	43	31
	70	27
	81	8
	81	17
	82	31
5330-00-761-8954	33	37
4730-00-762-1239	76	40
	76	44
5305-00-762-6041	90	3
	93	16
5310-00-763-8905	5	15
5310-00-763-8911	48	91
5310-00-763-8913	61	4
5310-00-763-8920	1	5
	91	86
5310-00-763-8921	91	37
5310-00-765-3197	74	66
5310-00-768-0319	57	19
5977-00-776-9967	33	58
4730-00-782-5582	20	17
5360-00-784-0330	17	58
2530-00-786-0222	74	85
5340-00-786-1550	17	114
5365-00-786-3964	17	61
2990-00-786-3968	17	137
5365-00-786-4025	17	145
5365-00-786-4027	17	60
5305-00-786-4032	17	56
5305-00-786-4033	17	106
2990-00-786-6341	17	130
5365-00-786-6343	17	29
2910-00-787-6422	17	99
5340-00-787-6424	17	128
2910-00-787-6428	17	91
5310-00-787-6466	17	26
5305-00-787-6468	17	98
2910-00-788-0986	17	141
2910-00-788-0988	17	25
2910-00-788-0989	17	15
5940-00-788-1586	43	4
	44	10
5340-00-788-2785	48	21
5330-00-788-8719	97	5
5940-00-789-6610	33	10
5310-00-791-9437	17	105
5310-00-796-8638	17	2
	17	45
5310-00-800-0695	5	2
	5	14
4730-00-801-8186	47	28
	47	31
5365-00-803-7299	91	71
5365-00-803-7321	46	30
5305-00-803-9742	33	61
5365-00-804-2027	17	81
5365-00-804-2192	92	8
5365-00-804-2782	46	42
5365-00-804-2784	96	3
	96	13
5365-00-804-9666	33	29
5365-00-806-4105	74	43
5935-00-807-4109	37	1
5310-00-809-3078	5	7
	18	8
	32	5
	91	82
5310-00-809-3079	42	9
	57	4
	57	8
	58	12
	75	37
	78	7
	79	14
5310-00-809-4061	8	23
	24	8
	25	7
	26	20
	28	26
	45	4

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STOCK NUMBER	FIG.	ITEM
5310-00-809-4061	58	14
	67	14
	76	78
	79	6
	81	3
	82	4
	82	9
	82	10
	82	16
	82	32
	82	52
	82	62
	95	50
	95	55
	97	15
5310-00-809-4085	34	48
5310-00-809-5998	82	25
5310-00-809-8533	91	26
5310-00-809-8536	80	2
5310-00-811-1377	78	9
4730-00-812-0924	59	7
	76	48
	95	4
	95	31
5307-00-812-7042	63	25
	65	25
5315-00-815-8840	67	15
5360-00-816-8227	17	129
5306-00-819-3038	17	135
5310-00-822-8525	42	11
5310-00-823-8803	89	7
5310-00-823-8804	24	26
	35	2
	82	42
4730-00-826-2347	76	62
4730-00-828-1142	19	20
5315-00-829-8334	23	4
5310-00-830-7825	17	10
2940-00-832-8729	19	12
5310-00-833-8567	37	4
3030-00-834-4915	30	7
5310-00-834-8732	57	3
	57	33
5310-00-834-8734	70	25
2540-00-835-9039	80	7
5330-00-838-1463	33	36
5365-00-838-8715	48	2
5315-00-839-2325	89	19
5315-00-839-2326	91	48
5315-00-839-5821	70	23
5315-00-839-5822	58	13
6620-00-841-1892	27	5
2920-00-841-3254	33	26
5315-00-842-3044	58	17
	67	13
5945-00-843-1778	32	6
5315-00-844-3665	79	42
5315-00-844-6796	5	16
4820-00-845-1096	26	16
5305-00-846-0129	17	1
3020-00-848-5567	28	22
5310-00-851-2674	81	23
	81	28
	91	16
5310-00-851-2682	33	17
5330-00-853-2376	17	51
4730-00-869-6363	94	20
2090-00-869-7142	82	47
2520-00-871-6818	60	3
	61	9
	62	2
4730-00-873-3398	94	26
5330-00-874-3744	13	14
6240-00-877-3405	39	2
5365-00-877-4952	17	132
5310-00-877-4956	17	18
5330-00-877-4960	17	48
5330-00-877-4972	17	125
5930-00-879-3593	41	5
5310-00-880-2004	63	24
	65	24
5315-00-880-6027	64	51
	66	51
5310-00-880-7744	23	7
	25	13
	57	29
	57	49
	67	10
	67	21
	70	9
	76	15
	76	65
	81	11
	82	38
	85	16
	95	23
5310-00-880-7745	48	35
	48	89
	54	3
	63	35

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-880-7745	65	35	3120-00-913-2456	79	2
5310-00-880-7746	74	72		96	4
5310-00-880-8189	34	46		96	14
5315-00-881-2705	57	11	5305-00-915-8087	67	3
	57	36		83	12
5340-00-882-0739	46	4	4320-00-922-4933	74	63
	46	17	3020-00-925-2760	30	6
	46	20	3120-00-929-8162	74	54
5360-00-884-8209	17	72	5365-00-930-5143	48	68
3120-00-886-6208	17	83		48	70
5360-00-887-1536	17	121	5360-00-930-9363	17	41
5315-00-887-1539	17	70	2910-00-932-4787	17	94
2910-00-887-1546	17	65	5310-00-934-9747	34	1
5305-00-887-1547	17	64	5310-00-934-9751	24	2
2910-00-887-1548	17	66		24	13
5305-00-887-1564	17	63		40	3
3120-00-888-6630	33	30		40	16
4730-00-891-0665	17	12	5310-00-934-9757	17	8
5310-00-891-5703	17	21		31	19
2520-00-891-5995	64	25		32	12
	66	25		33	15
3020-00-891-5996	64	24	5310-00-934-9758	14	18
	66	24		24	20
5365-00-891-8931	17	68		34	65
5305-00-891-8979	17	117		35	3
3120-00-892-3910	77	4		82	40
5977-00-893-0088	33	57	5310-00-935-1243	17	107
5355-00-893-5247	57	1		17	116
	57	6	5330-00-936-4587	17	90
	58	3	5340-00-939-1101	3	18
	89	1	5305-00-939-7063	45	11
5977-00-895-4138	33	44	5305-00-942-2196	8	6
4730-00-897-2460	17	36		13	18
2910-00-897-2461	17	57		19	16
2910-00-897-2466	17	131		24	17
2990-00-897-2539	17	126		24	24
2910-00-898-4926	17	38		25	8
5310-00-898-4927	17	39		26	1
5305-00-900-1118	45	9		27	1
3110-00-900-2560	47	18		44	25
5360-00-900-2564	17	53		47	11
5305-00-900-8496	33	60		58	16
2910-00-901-0749	17	43		72	33
2910-00-901-0753	17	50		76	80
4730-00-908-3193	49	21		82	12
	76	3		82	14
4730-00-909-8627	19	25		82	34
	26	8		82	61
	26	11		91	95
	76	22		95	52

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5305-00-942-2196	95	57
4730-00-946-7823	95	12
5360-00-947-1184	33	25
5305-00-947-4353	80	3
2920-00-947-4676	33	7
5310-00-949-9299	31	24
5310-00-950-1310	91	89
3110-00-953-4495	91	32
5310-00-953-5023	64	7
	66	7
4730-00-954-1281	47	1
	48	77
	49	3
	49	30
5305-00-957-6642	81	29
5305-00-958-5245	10	28
5305-00-958-5471	82	49
9505-00-962-7242	91	4
5305-00-964-0562	8	24
5360-00-969-0541	33	9
5310-00-971-7989	57	13
	57	39
	70	5
	70	18
2910-00-972-7959	17	16
5330-00-974-6643	17	32
	17	95
4730-00-974-7313	76	81
	95	36
5310-00-975-2075	60	2
	61	14
	62	7
5305-00-978-9368	17	110
5305-00-978-9377	91	66
5340-00-978-9974	79	37
2910-00-980-2285	17	122
2910-00-980-2301	17	31
5310-00-984-3806	25	17
	33	6
5305-00-984-6191	38	9
5305-00-989-5624	31	30
5365-00-992-7084	17	52
3120-00-993-4152	17	86
5325-00-998-3351	42	10
4730-00-998-7244	76	71
3110-01-005-6653	64	49
	66	49
5365-01-005-6678	64	48
	66	48
5930-01-006-2434	34	44A
3130-01-006-3356	61	3
4730-01-007-5233	95	34
5930-01-007-6490	40	10
3110-01-008-0222	63	21
	65	21
2540-01-008-1402	83	5
2540-01-008-6049	83	4
2520-01-008-6138	61	20
5305-01-010-2362	8	16
	69	3
5330-01-010-2428	85	10
5330-01-012-2288	87	
2940-01-012-4888	19	23
2520-01-013-9393	61	1
3120-01-013-9400	77	14
4820-01-013-9403	76	16
4730-01-014-1282	20	12
5330-01-014-6985	17	33
	17	96
5330-01-014-7293	88	18
	88	20
5330-01-014-7294	88	19
2520-01-017-0494	46	51
5305-01-017-1574	33	14
5310-01-018-0683	48	92
	48	119
2530-01-018-1670	68	10
5365-01-018-5220	48	3
5330-01-018-5359	48	79
5365-01-018-5450	48	26
	48	29
5310-01-019-2583	68	14
5910-01-019-6505	31	21
4730-01-020-5607	94	4
5365-01-020-5830	64	27
	66	27
5365-01-020-9391	64	28
	66	28
5365-01-020-9393	64	29
	66	29
5310-01-024-3111	15	5
5330-01-024-3346	48	115
5305-01-025-4832	91	30
5330-01-028-0213	97	7
5330-01-032-3168	87	
5910-01-035-7415	44	18
2920-01-036-7354	31	5
2940-01-038-2321	54	5
5330-01-038-4713	55	26
5330-01-040-4785	54	7

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-01-044-5457	14	3	5305-01-068-5490	15	6
5935-01-044-8382	35	5	5310-01-069-4887	91	94
2520-01-045-8766	50	4	2540-01-069-6690	83	11
	51	4	3805-01-070-0185	17	62
	52	4	5310-01-070-2105	26	23
	53	4		67	5
5310-01-047-6064	31	6		78	4
5961-01-047-6729	31	16		79	12
4730-01-049-4807	14	14		80	5
3110-01-052-0058	48	5		82	24
5330-01-052-5759	BULK	2		83	14
5330-01-054-1669	85	9		84	6
2910-01-054-3815	17	150		90	27
2910-01-054-3816	17	133	5340-01-070-4475	67	8
8030-01-054-3968	BULK	4	2910-01-070-6652	15	7
4730-01-055-4389	76	49	5977-01-070-9812	31	7
	95	3	5305-01-071-8139	91	22
	95	32	2910-01-075-1877	15	2
5360-01-055-4398	17	134	5330-01-077-5242	75	20
5305-01-055-6736	17	44	2640-01-078-1870	73	2
4730-01-055-8342	95	11	5940-01-078-2936	44	5
4820-01-056-2935	20	14	2590-01-079-8331	41	6
5365-01-057-0253	90	16	5305-01-081-0465	31	8
5340-01-057-8075	79	38	5330-01-081-0468	74	9
5310-01-057-8077	60	8	5310-01-081-0799	43	11
4730-01-058-2323	63	43	2530-01-081-1389	90	
	65	43	3040-01-081-1625	90	11
5310-01-058-3772	60	9	5999-01-081-9032	44	15
5940-01-058-6376	18	10A	2540-01-082-3968	83	7
	34	27	2920-01-083-4256	30	2
	34	38	6645-01-083-4759	34	30
	34	43	5305-01-083-9357	63	7
5340-01-059-7357	57	12		64	3
2530-01-061-1351	34	67		65	7
2815-01-064-8817	8	5		66	3
2815-01-064-8863	7	29	2920-01-084-0500	32	1
2990-01-065-1994	17	76	5305-01-084-4431	31	10
3020-01-065-2197	4	8	5330-01-084-8283	40	6
4730-01-066-0953	95	5	5310-01-084-9176	57	31
5310-01-066-2482	5	12	5320-01-085-1635	78	2
2910-01-066-4170	17	120	2590-01-085-1968	31	29
4730-01-066-5176	17	97	5999-01-085-6244	43	14
5310-01-066-9287	94	37	2920-01-085-7663	31	32
5340-01-066-9656	13	5	5310-01-086-0894	79	20
5310-01-067-3428	8	19	5305-01-086-1076	31	20
5306-01-067-6998	94	36	5330-01-086-1212	92	
5930-01-067-7382	40	13		93	
5330-01-067-8572	22	3	5305-01-086-3555	31	22
	22	6	5905-01-086-7048	34	6
5360-01-067-9764	15	3		43	15A

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5905-01-086-7048	44	12A
5310-01-086-7726	43	9
5340-01-087-0680	2	8
5330-01-088-6874	90	10
5340-01-088-8921	44	22
	58	15
5340-01-089-2881	57	45
	94	38
2920-01-089-3349	30	9
5340-01-090-8909	2	24
	3	10
5340-01-092-1637	82	46
9905-01-092-1918	63	8
	65	8
2590-01-093-4152	74	92
5930-01-098-4042	55	18
5940-01-098-7479	31	11
5315-01-099-0065	47	24
5360-01-099-0101	48	14
	48	34
	48	61
5365-01-099-0113	47	15
	48	44
5365-01-099-0114	48	7
3020-01-099-1102	46	23
5360-01-099-1419	55	25
5340-01-099-1427	48	15
	48	33
	48	62
3020-01-099-1755	47	26
3020-01-099-1756	48	8
2530-01-099-2382	74	10
3020-01-099-2725	46	18
2530-01-099-3045	74	61
2520-01-099-3931	50	2
	51	2
	52	2
	53	2
5360-01-099-3934	55	13
5365-01-099-3936	48	6
	48	9
5365-01-099-3937	47	14
2530-01-099-4408	74	59
5310-01-099-4980	46	35
3020-01-099-6126	46	15
3110-01-099-7303	46	34
3110-01-099-7304	48	23
	48	114
3110-01-099-7500	48	51
5310-01-099-7905	74	7

STOCK NUMBER	FIG.	ITEM
5365-01-099-8148	47	12
5365-01-099-8149	48	18
	48	31
	48	43
5365-01-099-8161	48	24
5365-01-099-8162	48	27
5330-01-099-8690	74	42
5330-01-099-8851	74	30
5365-01-099-8880	74	53
5307-01-099-9073	47	5
3110-01-099-9557	47	6
4320-01-100-0162	54	6
5340-01-100-2474	82	45
2520-01-100-4584	52	5
	53	10
5365-01-100-5099	74	36
	74	86
5330-01-100-5100	74	48
5305-01-100-6630	64	17
	66	17
6680-01-100-7436	49	23
6680-01-100-7437	97	2
4710-01-100-7836	14	7
2815-01-100-9275	10	1
2815-01-100-9276	5	3
2815-01-100-9284	4	14
2815-01-100-9285	2	17
2590-01-100-9292	43	1
5365-01-100-9348	46	33
4710-01-101-0183	20	11
2590-01-101-0230	44	1
4710-01-101-0734	59	10
	59	11
2520-01-101-0937	46	3
	46	11
4820-01-101-0938	17	133
3040-01-101-1026	77	2
3120-01-101-1425	74	56
2920-01-101-1551	35	4
4730-01-101-1594	76	28
3930-01-101-1595	77	15
2540-01-101-1596	82	54
3010-01-101-1623	61	19
5365-01-101-1633	48	67
5365-01-101-1634	50	1
	51	1
	52	1
	53	1
2540-01-101-1636	84	4
2815-01-101-1637	6	8

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
3040-01-101-1823	92	7	5330-01-101-8172	2	20
3040-01-101-1846	7	24	5330-01-101-8173	75	9
2930-01-101-2544	28	9	5330-01-101-8174	93	13
2920-01-101-2552	17	151	5315-01-101-8213	79	1
3040-01-101-2560	92	36	5315-01-101-8215	77	24
4720-01-101-2584	26	10	5315-01-101-8216	79	41
4730-01-101-2813	49	15	5315-01-101-8217	91	70
4730-01-101-2815	72	20	5365-01-101-8255	48	49
2520-01-101-2927	50	5	5306-01-101-8521	91	27
3040-01-101-3004	92		5306-01-101-8522	91	3
2930-01-101-3047	26	7	5310-01-101-8557	91	46
3040-01-101-3726	93		2815-01-101-9011	7	30
2910-01-101-3815	21	3	5306-01-101-9416	30	5
5365-01-101-3821	48	83	5305-01-101-9423	14	15
2815-01-101-4707	3	8	5305-01-101-9433	17	115
3110-01-101-4748	47	16	3120-01-101-9511	96	12
5330-01-101-4773	54	8	4730-01-101-9541	94	15
5365-01-101-4920	48	60	3020-01-101-9557	91	15
4720-01-101-5235	76	2	3040-01-101-9579	2	9
4720-01-101-5236	95	47	5305-01-102-0311	79	19
4720-01-101-5237	95	46	5310-01-102-0329	91	73
4720-01-101-5238	76	25	5310-01-102-0332	30	4
4720-01-101-5239	76	24	5310-01-102-0333	97	8
4720-01-101-5240	95	41	5330-01-102-0342	88	13
4720-01-101-5241	95	39		88	22
4720-01-101-5242	95	37	5330-01-102-0343	85	14
4720-01-101-5243	95	43	5330-01-102-0346	7	3
4720-01-101-5244	95	58	5330-01-102-0347	75	36
4720-01-101-5245	95	20	3120-01-102-0378	58	11
4720-01-101-5246	95	21	3120-01-102-0379	79	22
4720-01-101-5247	95	40	3130-01-102-0433	82	28
4720-01-101-5248	95	38	5360-01-102-0740	17	127
4720-01-101-5249	94	1	5365-01-102-0775	91	90
4720-01-101-5250	94	29	2590-01-102-1554	32	7
4720-01-101-5251	94	30	5305-01-102-1854	83	2
4720-01-101-5252	94	28	5305-01-102-1867	78	12
4720-01-101-5253	94	25	5310-01-102-1884	1	8
4720-01-101-5254	94	14	3120-01-102-1927	91	55
2920-01-101-7357	41	7	5365-01-102-1945	91	10
4730-01-101-7364	94	31	5315-01-102-1948	90	23
4730-01-101-7368	40	12	5315-01-102-1949	91	49
4730-01-101-7370	95	19	5340-01-102-1964	70	29
4730-01-101-7371	95	35	5360-01-102-1978	24	11
4730-01-101-7372	28	4	5340-01-102-1988	91	69
3020-01-101-7413	91	51	5310-01-102-2398	31	1
2930-01-101-7427	26	28	5306-01-102-2649	6	12
3040-01-101-7460	77	1	5305-01-102-2659	34	29
3040-01-101-7461	96	1	5305-01-102-2660	34	64
2815-01-101-7499	7	31	5305-01-102-2661	32	9
3040-01-101-7500	57	35	5305-01-102-2662	35	6

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-01-102-2663	81	15	3010-01-103-7441	62	
6220-01-102-2794	39	1	5310-01-103-8628	74	57
5315-01-102-2905	17	123	5330-01-103-8771	87	20
5340-01-102-3058	93	9		88	32
5340-01-102-3059	57	38	4720-01-103-8947	72	18
6115-01-102-3063	31	3	2920-01-103-8952	30	15
5925-01-102-3630	32	10	5330-01-103-9071	36	5
2520-01-102-3832	59	1	3930-01-103-9132	91	59
3040-01-102-4224	90	1	3010-01-104-0361	51	3
2910-01-102-4251	18	10		52	3
2920-01-102-4998	33	1		53	3
5310-01-102-5586	91	72		53	9
5310-01-102-5587	91	19	4140-01-104-0688	29	1
3120-01-102-5648	6	6	2815-01-104-0709	46	50
3040-01-102-5745	47	17	6680-01-104-0899	40	7
3020-01-102-5747	91	34	4820-01-104-0949	95	7
2590-01-102-5806	81	19	5307-01-104-1112	3	16
5340-01-102-5861	84	5	4720-01-104-4032	59	8
2815-01-102-6269	3	9	5330-01-104-4563	54	
4730-01-102-6544	18	1	5330-01-104-4564	55	
4820-01-102-6573	87		5306-01-104-4825	63	51
5340-01-102-7667	76	79		65	51
2815-01-102-8414	6		5365-01-104-5252	46	6
5360-01-102-9695	95	9		46	10
3120-01-102-9942	6	9		46	14
3020-01-103-0199	46	7		46	16
5360-01-103-0251	70	7		46	21
5365-01-103-1609	74	17	5340-01-104-5273	7	32
5330-01-103-1788	20	4	5310-01-104-5936	48	12
5365-01-103-1886	11	7		48	53
5355-01-103-3258	81	24	5315-01-104-6068	82	43
2940-01-103-3265	95	10	5365-01-104-6200	48	71
4320-01-103-3314	46	41	5340-01-104-7831	47	21
3020-01-103-3315	48	28	5340-01-104-7832	46	26
2910-01-103-3390	15	1	3010-01-105-0393	48	65
2990-01-103-3391	25	1	5925-01-105-0926	34	35
3020-01-103-3403	48	20	5925-01-105-0927	34	25
2990-01-103-3422	25	3	5925-01-105-0928	34	40
3040-01-103-3426	24	18	3110-01-105-1210	31	28
2530-01-103-3430	74	1	3110-01-105-1929	91	33
4710-01-103-3447	49	17	3110-01-105-1933	31	34
4720-01-103-3456	26	9	5340-01-105-2190	90	24
2930-01-103-4246	26	18	5340-01-105-2192	91	50
3020-01-103-4264	47	19	5360-01-105-2254	91	67
3040-01-103-4309	48	116	5340-01-105-2267	58	5
5310-01-103-5746	96	21	5340-01-105-2271	43	27
3020-01-103-6117	48	112	5365-01-105-2982	48	11
2920-01-103-6389	47	9		48	52
3010-01-103-7439	48	19	5365-01-105-2983	48	16
3010-01-103-7440	50	3		48	32

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5365-01-105-2983	48	63
2520-01-105-7088	45	3
3110-01-105-7310	48	101
5307-01-105-7329	48	40
	48	87
5315-01-105-7362	47	23
	48	17
	48	64
5307-01-105-9449	57	32
4820-01-105-9925	87	29
6680-01-106-0039	34	3
4720-01-106-0317	72	6
4720-01-106-0798	76	53
4720-01-106-1742	72	31
4820-01-106-1759	87	
6240-01-106-2447	34	69
2590-01-106-3971	74	77
4820-01-106-4053	86	10
3010-01-106-4235	64	34
	66	34
2815-01-106-4695	11	5
5307-01-106-5317	47	4
2520-01-106-6811	48	103
4320-01-106-7118	74	14
2520-01-106-8281	97	10
2520-01-106-8339	57	14
2990-01-106-9245	48	47
2920-01-106-9580	34	28
4820-01-106-9806	55	15
3010-01-107-2154	62	11
2530-01-107-2218	71	31
2920-01-107-2326	34	24
4720-01-107-2348	49	22
6220-01-107-2582	36	2
5307-01-107-3676	48	73
3020-01-107-5374	75	13
3040-01-107-5673	48	72
3020-01-107-6918	75	24
2530-01-107-8261	67	6
6620-01-108-9250	34	4
5330-01-109-1362	63	38
	65	38
5360-01-109-1631	74	27
5306-01-109-4109	67	16
5310-01-109-4250	63	16
	65	16
5365-01-109-4251	91	84
5365-01-109-4253	46	45
3110-01-109-5516	74	26
5365-01-109-5631	57	50
5310-01-109-6056	64	31
	66	31
3110-01-109-6090	48	109
	48	111
5310-01-109-6757	91	85
	91	87
5340-01-109-7060	71	14
3120-01-109-7563	48	102
	48	113
2520-01-109-7958	55	3
2520-01-109-7959	55	4
2815-01-109-7969	1	10
5310-01-109-9405	74	44
5340-01-110-1818	49	14
5315-01-110-7836	17	19
5306-01-110-7893	83	16
5305-01-110-7902	74	3
5330-01-110-7939	56	9
5315-01-110-8005	77	23
5315-01-110-8010	90	29
5315-01-110-8011	74	34
	74	60
3040-01-111-5680	77	
3040-01-111-5681	96	
2920-01-112-3832	31	4
5307-01-112-4450	48	96
5315-01-112-8112	48	104
4720-01-113-2040	19	24
5330-01-113-5706	86	
5930-01-113-5919	40	1
6680-01-113-6241	12	1
6350-01-113-8974	41	2
5305-01-114-3776	64	12
	66	12
6140-01-114-6622	42	5
6140-01-114-6623	42	6
2910-01-114-8608	17	
6150-01-115-0846	35	1
6140-01-115-0858	42	3
3040-01-115-0904	91	43
5930-01-115-4244	40	17
6210-01-117-1929	34	18
6210-01-117-1930	34	9
6210-01-117-2455	34	12
2920-01-117-3251	17	5
5340-01-117-3797	1	3
5940-01-117-4047	31	17
5365-01-118-2857	48	13
	48	54

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5307-01-118-6441	63	23	3930-01-158-9369	91	
	65	23	2610-01-159-1864	73	4
5305-01-118-8781	31	9		73	4
3120-01-119-0510	47	27	4330-01-159-5840	21	
5999-01-119-4109	43	17	4720-01-159-7694	95	62
4930-01-119-4558	49	39	4720-01-159-7695	95	61
	55	22	3020-01-159-7835	91	92
5315-01-119-5240	55	19	4710-01-159-7977	94	35
4820-01-120-4532	12		4720-01-159-7979	18	5
3040-01-120-8548	91	76	5340-01-159-8534	17	67
5310-01-121-5538	48	22	4720-01-159-8638	95	60
2520-01-121-6377	48	56	4710-01-159-9811	94	34
5340-01-121-8208	1	3A	5340-01-160-2154	25	15
4710-01-122-9664	64	8	4730-01-160-9129	94	32
3020-01-123-2696	64	26	4720-01-161-2046	95	59
	66	26	5310-01-161-4014	94	39
4730-01-123-6937	95	44	3020-01-161-7799	91	12
4730-01-123-8618	94	9	2520-01-162-4402	49	42
4320-01-124-4130	75	1	2520-01-162-4404	51	8
3010-01-124-7903	48	37	2520-01-162-4405	52	8
2530-01-124-9373	74	29	2520-01-162-5171	53	8
5306-01-125-1989	75	28	4010-01-163-6006	80	4
5305-01-125-1997	91	88	2920-01-163-7872	33	42
2590-01-125-4242	67	1	3930-01-168-9545	91	44
5365-01-125-5329	88	21	3930-01-168-9546	91	29
5310-01-125-6254	91	36	3930-01-168-9547	91	78
5306-01-126-1169	75	29	3930-01-168-9548	91	79
5330-01-126-1234	74	80	2510-01-169-1989	42	2
8040-01-126-1422	BULK	1	5925-01-170-5762	34	26
5306-01-129-9787	74	46		34	42
5310-01-129-9829	34	70	3130-01-170-6086	48	66
5365-01-130-6254	75	2	9905-01-171-2858	79	10
2530-01-133-7615	73	3	3930-01-171-4503	94	
5330-01-135-4807	74	19	3930-01-171-4504	91	
3120-01-136-8620	2	23	4710-01-171-5198	72	1
5975-01-142-6169	30	11	4710-01-171-6971	72	11
	34	39	4710-01-171-6972	72	21
	43	30	5365-01-171-8054	91	31
	44	31	2940-01-172-0660	19	10
	72	30	2530-01-172-0664	68	9
5360-01-144-7446	57	21	4710-01-172-0884	72	7
5330-01-144-8706	28	14		72	9
2920-01-145-0351	34	24	4730-01-172-2677	95	42
6250-01-146-6909	43	16	2530-01-172-2719	74	83
5310-01-151-9290	91	11	2530-01-172-2778	68	1
5935-01-156-7020	43	6	3020-01-172-2787	91	24
2510-01-157-7996	82	58	5330-01-172-6382	64	35A
2815-01-157-8017	13	11		66	35A
2940-01-158-4608	97	18	5315-01-172-6488	70	26
2540-01-158-8805	80	1	5360-01-172-6494	94	3

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-01-173-4170	72	4			
5340-01-173-5648	70	14			
2590-01-173-9613	40	4			
6210-01-175-1091	34	7			
5330-01-181-2430	55	11			
2815-01-182-7424	12				
2510-01-185-3881	78	1			
5365-01-186-0813	75	35			
2510-01-187-6517	84	3			
2910-01-188-3248	17	54			
2910-01-188-3683	17	54			
3040-01-189-8962	57	15			
2940-01-190-3829	19	4			
5340-01-191-7768	90	20			
	92	4			
	93	6			
	96	9			
2910-01-191-8465	17	79			
3040-01-195-9187	75	31			
2520-01-196-8012	63	1			
	65	1			
2520-01-200-5636	70	12			
2530-01-204-2582	64	1			
	66	1			
4720-01-204-9534	26	15			
4730-01-205-7781	74	68			
3040-01-206-0893	92	15			
2520-01-206-0921	63	12			
	65	12			
2520-01-206-8580	63	32			
	65	32			
5365-01-208-6854	81	14			
3020-01-209-2380	64	22			
	66	22			
5306-01-209-7094	97	9			
5306-01-209-9284	67	12			
5330-01-209-9444	92	30			
4710-01-210-0482	94	5			
5330-01-211-1517	92	19			
2815-01-213-1041	65	37			
2510-01-215-1700	81	20			

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			12	10
			12	20
			12	30
			12	40
			92	70
78500	A-1205-S-1527	5330-01-172-6382	64	35A
			66	35A
78500	A-1205-T-1502-S	5330-01-109-1362	63	38
			65	38
78500	A-3236-E-1669-S		69	1
78500	A-35510-7	3020-01-123-2696	64	26
			66	26
78225	AAX-0665-03	2930-01-103-4246	26	18
88044	AN365-420A	5310-00-208-1919	91	81
70485	AN931-85-12		34	68
78500	A1-3235Z884		64	16
			66	16
78500	A1-3897-X-1896	3010-01-106-4235	64	34
			66	34
10988	A11822	5330-00-496-8327	40	8
10988	A12032	5340-01-089-2881	57	45
			94	38
10988	A12308	5340-01-102-7667	76	79
10988	A12864	4730-00-407-4756	72	24
10988	A13240	5340-00-456-5508	19	3
			25	2
10988	A136474		2	19
10988	A136712	3120-01-102-9942	6	9
10988	A138245		8	2
10988	A138348		6	3
10988	A140222	5365-01-103-1886	11	7
10988	A14078		57	44
10988	A142098	5330-01-102-0346	7	3
10988	A142350		6	2
10988	A142499	5330-01-144-8706	28	14
10988	A142906	4710-01-100-7836	14	7
10988	A142982		6	1
10988	A144011	2815-01-100-9284	4	14
10988	A144046		28	5
10988	A146537		28	17
10988	A146584	2930-01-101-2544	28	9
10988	A148745		3	6
10988	A150100	6680-01-113-6241	12	1
10988	A151075	3120-01-136-8620	2	23
10988	A151244		6	4
10988	A151279		11	3
10988	A151892	2815-01-102-8414	6	
10988	A152312		28	13
10988	A152488	2815-01-101-4707	3	8
10988	A152489	2815-01-102-6269	3	9
10988	A152536	2815-01-157-8017	13	11

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	A152625		2	32
10988	A152645		2	15
10988	A152715	4730-01-101-7372	28	4
10988	A152801		28	3
10988	A152851		10	2
10988	A153248	5307-01-104-1112	3	16
10988	A154661	2815-01-109-7969	1	10
10988	A154662	2815-01-100-9276	5	3
10988	A154663		5	10
10988	A154664		5	9
10988	A154697	3040-01-101-9579	2	9
10988	A154698		2	12
10988	A154699		2	11
10988	A154909		22	4
10988	A154934		22	1
10988	A15888	5330-01-054-1669	85	9
10988	A160391	2920-01-089-3349	30	9
10988	A166029		3	7
10988	A18311	2590-01-102-1554	32	7
10988	A18531	2530-00-405-6764	72	26
10988	A18709	5340-01-102-3059	57	38
10988	A19068		45	7
78500	A2-3200S1111		64	2
			66	2
78500	A2-3226E655		64	38
			66	38
10988	A20916	5365-00-111-8708	13	15
			23	1
10988	A22553		2	13
10988	A23725	2540-01-101-1596	82	54
10988	A26673		2	2
10988	A27365	5330-00-451-0118	10	31
10988	A27410	5330-00-788-8719	97	5
10988	A28318		93	3
			96	6
10988	A29068		5	17
10988	A29259		4	7
10988	A29260		10	18
10988	A29279	4820-00-215-7436	10	16
10988	A29290	2815-00-223-4941	9	3
10988	A29363		5	8
10988	A29431	5307-00-125-7608	3	12
10988	A29433	5307-00-111-2300	28	27
10988	A29438	5310-00-440-9646	9	7
78500	A3-3722D134		69	5
10988	A30004	2815-00-288-4869	7	19
10988	A30013	5310-01-066-2482	5	12
10988	A30025	5360-00-489-8271	7	16
10988	A30043	5310-00-508-8942	16	2
10988	A30056	5306-00-479-4126	9	5
10988	A30063	5310-00-451-0115	9	8

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10988	A30095		90	18
10988	A30135		5	1
10988	A31060	2590-01-173-9613	40	4
41625	A31126	3040-00-051-5225	24	1
78500	A3121N456		63	10
			65	10
41625	A31804	5340-00-494-7430	24	3
78500	A3226E655		66	39
78500	A333H268		63	19
			65	19
10988	A34000	4320-00-383-3817	28	12
10988	A34471	5306-01-101-8522	91	3
10988	A34705	2920-01-083-4256	30	2
10988	A35028	5340-01-066-9656	13	5
10988	A35175	5307-00-111-8709	3	17
10988	A35273		11	1
10988	A35673	2805-00-054-6923	4	9
10988	A35770		6	7
10988	A36480	3120-00-441-9991	4	4
10988	A36481		4	4
10988	A36482		4	4
10988	A36483		4	4
10988	A36484		4	4
10988	A36485	3120-00-449-5818	4	2
10988	A36486		4	2
10988	A36487		4	2
10988	A36488		4	2
10988	A36489		4	2
10988	A36490	3120-00-441-9993	4	3
10988	A36491		4	3
10988	A36492		4	3
10988	A36493		4	3
10988	A36494		4	3
10988	A36495	3120-00-449-5819	4	1
10988	A36496		4	1
10988	A36497		4	1
			4	1
10988	A36499		4	1
10988	A36615	2815-01-101-7499	7	31
10988	A36717	2815-01-106-4695	11	5
10988	A36718		11	6
10988	A36815	2815-00-223-4918	7	7
10988	A36902	5307-00-097-7725	2	16
10988	A37149	2815-01-100-9285	2	17
10988	A37206	2990-00-468-3986	2	25
10988	A37751		28	15
10988	A37753		28	10
10988	A37754		28	11
10988	A37842	4710-00-097-7705	14	17
10988	A37844	4710-00-172-5622	14	19
10988	A37846	4710-00-097-7712	14	20

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	A37848	4710-00-097-7711	14	21
10988	A38083	5330-00-162-3753	28	8
10988	A38084		28	1
10988	A38160	4730-00-414-8354	14	9
10988	A38161		14	11
10988	A38181	2815-00-223-4925	7	25
10988	A38188		13	3
10988	A38372	2805-00-054-6945	10	
10988	A38385		2	30
10988	A38390	5330-00-439-4995	4	16
10988	A38644	4730-00-470-6736	14	2
10988	A38931	3020-00-172-5619	9	6
10988	A38943		2	10
10988	A39013	2815-00-172-1867	9	1
10988	A39046	5310-00-414-9746	3	2
10988	A39047	5306-00-559-5267	3	1
10988	A39048	5306-00-558-1034	3	5
10988	A39049	5306-00-558-1035	3	4
10988	A39110	5330-00-417-0525	8	8
10988	A39111	5330-00-405-8947	4	17
10988	A39113	5330-00-487-4368	4	15
10988	A39129	5307-00-721-5547	3	11
10988	A39132	5315-00-480-4433	4	5
10988	A39188		4	10
10988	A39233	2815-00-399-1148	13	8
10988	A39268	2815-00-223-4929	3	14
10988	A39288		4	6
10988	A39321		10	21
10988	A39896	2815-01-100-9275	10	1
10988	A39925	5330-00-395-6586	8	4
10988	A41491	2530-00-119-3725	92	2
10988	A41726	2815-00-172-1870	7	13
10988	A41727	2815-00-001-0022	7	14
10988	A42315	5330-00-427-7230	22	8
10988	A43030	5330-00-008-5967	7	8
10988	A44710	2910-00-980-2285	17	122
10988	A44758	5330-00-484-1769	11	
10988	A50820	5310-01-067-3428	8	19
10988	A50962	3020-01-065-2197	4	8
10988	A50975	3120-01-102-5648	6	6
10988	A50976		6	6
10988	A50977		6	6
10988	A50978		6	6
10988	A50979		6	6
10988	A51084	2815-01-064-8863	7	29
10988	A51114	5340-00-558-1033	3	3
10988	A51148	2815-00-449-8661	7	26
10988	A51149	2815-00-467-0578	7	28
10988	A51271	5307-00-558-1820	7	22
10988	A51500	5307-00-556-9797	3	15
10988	A51529		8	28

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	A51529		28	28
10988	A51649	5307-00-395-6661	8	3
10988	A51784	4710-00-394-2714	14	12
10988	A51904	5310-00-106-9927	6	11
10988	A51908	2815-01-064-8817	8	5
10988	A51912		6	10
10988	A51913	2815-01-101-1637	6	8
10988	A51914	5306-01-102-2649	6	12
10988	A51916	5330-01-101-8172	2	20
10988	A56132	5340-00-254-4639	70	22
10988	A58608	5330-00-358-0286	11	8
10988	A58709	2910-00-155-3198	14	16
10988	A59077	5307-00-432-8471	45	14
10988	A59516	5340-01-121-8208	1	3A
10988	A60212		77	11
10988	A61429		77	17
10988	A61430		77	16
10988	A62070		77	10
10988	A7085	5310-00-440-9934	28	18
78500	A8-3235Z884		64	15
			66	15
10988	A9155	4730-00-359-2324	7	4
81205	BACT12B301	5940-00-283-5280	43	3
55880	BL534	3020-01-102-5747	91	34
92865	B125417		71	5
51588	B20-L	3120-00-913-2456	79	2
			96	4
			96	14
78500	B52-333H268		63	18
			65	18
78500	B53-333H268		63	14
			65	14
23040	B8QH7065B	3110-00-554-3450	48	82
78500	B993235884		64	9
			66	9
45225	CAS-1704		98	1
45225	CAS-1704-1		98	2
45225	CAS-1704-2		98	1
75272	CCV-0917	5340-00-005-0917	67	2
92563	CFH-13/4-SB		91	28
75272	COV-0513	5340-00-414-9846	76	12
75272	COV1113	5340-00-518-1440	95	26
70960	CP62N14	2520-00-871-6818	60	3
			61	9
			62	2
70960	CSH6-24-20	5305-00-148-3797	60	1
			61	18
			62	12
75272	CO-1813	5340-01-104-5273	7	32
75272	COV0413	5340-00-448-1795	23	3
			43	23

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
75272	COV0913	5340-00-404-4169	44	26
			72	32
73821	C1100-125-3000M	5360-01-144-7446	57	21
78500	C3121N456		63	9
			65	9
76359	C3472-1		83	6
78500	D-140-FSHX20	2520-01-196-8012	63	1
			65	1
10988	D-26918	5365-00-420-3857	79	44
			91	91
10988	D-33552		95	27
10988	D-35217	5365-01-109-5631	57	50
10988	D-43831	5360-01-105-2254	91	67
10988	D-44841	5315-01-110-8010	90	29
84760	DB0431AL3813	2910-01-114-8608	17	
70960	DCD36-3		61	17
			62	10
70960	DC62N1	5330-00-117-0085	61	
			62	
10988	D22200	3120-00-892-3910	77	4
10988	D30930	3120-00-111-2280	90	6
10988	D30933	3120-00-111-2253	79	30
10988	D34359	3120-01-013-9400	77	14
10988	D34666		45	10
10988	D34668	5310-01-086-0894	79	20
10988	D35009	5310-00-458-8452	1	2
10988	D36434		79	27
10988	D36478		79	33
10988	D36968		77	8
			93	8
10988	D36969	5330-00-411-9151	90	19
10988	D37732	5310-00-026-3037	78	10
10988	D38774	5365-00-543-4174	91	54
10988	D39023	5310-01-161-4014	94	39
10988	D40471	5340-01-088-8921	44	22
			58	15
10988	D43266		1	7
			63	49
			65	49
			77	20
10988	D52275		26	13
10988	D55273	5330-01-103-9071	36	5
10988	D63931	5340-01-117-3797	1	3
10988	D64050	5310-01-084-9176	57	31
10988	D64267		18	3
			20	8
10988	D80538	2940-01-103-3265	95	10
10988	D87213	5930-01-098-4042	55	18
10988	D95141		77	9
			93	7
40441	EX-709	6220-01-107-2582	36	2

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
63477	FC602F	5330-00-450-1914	72	25
63477	FC603F	5310-00-481-6573	72	27
63477	FD21083	2530-00-758-0039	69	10
70417	FF-718-1	3120-00-661-5133	89	5
			89	9
			89	12
			89	15
87946	FMN6	3130-01-102-0433	82	28
02249	FS-251-2A0G		95	6
18265	FWG06-5131	2940-01-190-3829	19	4
29944	F02205	2540-01-069-6690	83	11
76359	F14003		83	1
76359	F2064-1		83	3
76359	F2064-2		83	10
76359	F4033-7	2540-01-008-1402	83	5
76359	F6204-1	2540-01-008-6049	83	4
10988	F62075	5330-00-757-7545	28	28
10988	F62076		96	18
10988	G-34820		77	6
80657	G-403-Q	5315-01-110-8011	74	34
			74	60
18265	GAX00-1966	1040-00-190-0983	19	1
10988	G100441		90	7
10988	G100442	3040-01-081-1625	90	11
10988	G100443	5330-01-088-6874	90	10
10988	G100444		90	9
10988	G100449		90	8
			92	37
10988	G100707		93	10
10988	G100708		93	14
10988	G100713		93	12
10988	G100714		93	11
			96	20
10988	G101127		0090	22
10988	G101837		77	19
10988	G101994		92	11
10988	G101995		92	12
10988	G102085		92	23
10988	G102289	5330-01-101-8174	93	13
10988	G102404	2530-01-081-1389	90	
10988	G102407	5330-01-086-1212	93	
10988	G102424		90	21
10988	G102569		90	13
		5340-01-191-7768	90	20
			92	4
			92	18
			92	31
			93	6
			96	9
10988	G103208		92	24
10988	G103213	5330-01-211-1517	92	19

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	G103214		92	20
10988	G103216	3040-01-101-1823	92	7
10988	G103217		92	9
10988	G103218	3040-01-206-0893	92	15
10988	G103221		92	1
10988	G103222		92	3
10988	G103223		92	5
			92	34
10988	G103232	3040-01-101-3726	93	
10988	G103233		93	1
10988	G103238	5340-01-102-3058	93	9
10988	G103241	3040-01-101-7461	96	1
10988	G103242		96	2
10988	G103247	3120-01-101-9511	96	12
10988	G103255		93	5
10988	G103257		96	8
10988	G103284		92	10
10988	G103285		92	25
10988	G103286		92	27
10988	G103461		92	16
10988	G103462		92	28
10988	G103475	3040-01-101-2560	92	36
10988	G103480	5330-01-209-9444	92	30
10988	G103481		92	29
10988	G103482		92	32
10988	G103483		92	33
10988	G103549	3040-01-102-4224	90	1
10988	G103550		90	4
10988	G103557		90	12
10988	G103558		90	14
10988	G103559		90	15
10988	G103568		93	2
10988	G103569		96	5
10988	G103727	3040-01-101-7460	77	1
10988	G107906	3040-01-101-3004	92	
10988	G107912	3040-01-K25-8457	92	
10988	G11204	5307-00-317-2225	8	1
10988	G11271		30	1
10988	G11334		10	25
10988	G11335		10	12
10988	G11336		10	19
10988	G11337	5365-00-459-9779	10	29
10988	G11338	5365-00-459-9780	10	30
10988	G11339	3020-00-848-5567	28	22
10988	G11710	3020-00-097-7720	5	11
10988	G11716		5	4
10988	G11717		7	17
10988	G11726	3130-00-172-4206	8	18
10988	G11727		8	14
10988	G11728	5365-00-450-4135	8	12
10988	G11729	5365-00-450-4134	8	12

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	G11730	5365-00-450-4133	8	12
10988	G11731	5365-00-450-4132	8	12
10988	G11732		8	11
10988	G11746	2815-00-172-1869	8	10
10988	G11748		10	24
10988	G11838		10	5
10988	G11857		8	13
10988	G11883		7	23
10988	G11896		10	9
10988	G15457	5330-00-045-7410	92	14
78500	G16-3200-S-1111/ 680	2530-01-204-2582	64	1
			66	1
10988	G2039		10	6
10988	G2076	3020-00-399-1135	16	4
10988	G2100	3040-01-101-1846	7	24
10988	G2101	2815-01-101-9011	7	30
10988	G2109		10	15
10988	G2115		10	10
10988	G2126		2	27
10988	G2127		2	29
10988	G2128		2	28
10988	G2144		27	3
10988	G32122		90	17
10988	G32126		92	13
10988	G32129		93	4
			96	7
10988	G32317	5310-00-451-1690	90	2
			93	15
10988	G33140		96	17
10988	G33955		96	10
10988	G34299	5365-01-057-0253	90	16
10988	G34804		96	19
10988	G34816		77	7
10988	G34817		77	18
10988	G34819	3040-01-111-5680	77	
10988	G34954		77	13
10988	G34959	3040-01-101-1026	77	2
10988	G35269		96	16
10988	G35272	3930-01-101-1595	77	15
10988	G35372		96	11
10988	G35378	3040-01-111-5681	96	
10988	G37068		10	22
77640	G420460	5305-00-237-8028	74	64
10988	G46702		6	5
10988	G46851		7	18
10988	G46852		10	8
10988	G46853	5330-00-054-6962	13	4
			25	11
10988	G46871	5330-00-097-7721	13	10
10988	G46872	5330-00-097-7722	13	9

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10988	G46907	5330-00-465-2622	27	4
10988	G47079	2815-00-223-4926	7	11
10988	G48500		10	17
10988	G48501	5360-00-458-8455	7	27
10988	G49065		7	15
10988	G49070		2	22
10988	G49080	5365-00-043-1503	22	7
10988	G49400	5310-00-425-6434	7	2
10988	G49404		2	34
10988	G49407	5365-00-891-8931	17	68
10988	G49608	3120-00-111-8707	2	18
10988	G49653		10	7
10988	G49654		10	14
10988	G49660		8	15
10988	G49672		10	23
99699	HD54-24-19PN		43	12
99699	HD56-24-19SN		44	16
77640	HGA012014		74	22
77640	HGA013006		74	15
77640	HGA014000		74	11
04994	HGA014000-A1	2530-01-099-2382	74	10
77640	HGA015001		74	13
77640	HGA016002		74	47
77640	HGA018001		74	12
77640	HGA28015-A1-1050	2530-01-103-3430	74	1
77640	HGA287005	4320-01-106-7118	74	14
60038	HM-803146	3110-00-691-2511	64	44
			66	44
78500	HM803110	3110-00-691-2512	64	42
			66	42
08752	H2-66-231		75	3D
10988	H342774	5930-01-115-4244	40	17
78189	H62-311275-02	5310-00-100-6811	11	4
78500	JM511910	3110-01-005-6653	64	49
			66	49
76005	J6198-9	5340-00-978-9974	79	37
76005	J7153-1	5365-00-020-8588	26	14
02249	K-28062	5330-01-113-5706	86	
02249	K-6030-A	4820-01-102-6573	87	
02249	K-6033	4820-01-106-1759	87	
02249	K-6125	4820-01-105-9925	87	29
02249	K-6132	4820-01-106-4053	86	10
30327	KF04-02PS	4730-00-595-1078	63	47
			65	47
30327	KF04-02RS	4730-01-058-2323	63	43
			65	43
02249	K23025	5360-01-102-9695	95	9
02249	K6032	5330-01-032-3168	87	
02249	K6035	5330-01-012-2288	87	
77640	K67240		74	87
77640	K67241		74	70

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77640	K67242	2530-01-172-2719	74	83
77640	K67292		74	2
77640	K68107		74	24
77640	K68108		74	18
77640	K68112		74	21
10988	L-101881	2990-01-103-3391	25	1
10988	L-103592	5307-01-105-9449	57	32
10988	L-104128	4710-01-103-3447	49	17
10988	L-112956	2530-01-133-7615	73	3
10988	L-60113	5315-01-110-8005	77	23
10988	L-74743	4720-01-103-3456	26	9
10988	L-78472	4720-01-106-1742	72	31
61112	LP-4821-1	4730-00-339-0714	23	13
61112	LP2287		23	16
61112	LP2290		23	14
61112	LP2299-1	5340-00-269-0281	23	11
61112	LP3239-60		23	10
61112	LP3904		23	18
61112	LP535-1	2910-00-646-9727	23	19
77326	LS105-6		34	23
77326	LS220		34	22
10988	L10051	5940-01-058-6376	18	10A
10988	L100729		57	17
10988	L100766		32	8
10988	L100862	6140-01-114-6622	42	5
10988	L100960		75	3B
10988	L101052	4720-01-101-2584	26	10
10988	L101361	2910-01-101-3815	21	3
10988	L101450	3930-01-103-9132	91	59
10988	L101486		45	8
10988	L101491		79	4
10988	L101567	5340-01-173-5648	70	14
10988	L101605	4320-01-124-4130	75	1
10988	L101689		70	6
10988	L101690		70	4
10988	L101710		79	5
10988	L101725	3020-01-101-9557	91	15
10988	L101727	3020-01-101-7413	91	51
10988	L101729		20	3
10988	L101751	5365-01-102-1945	91	10
10988	L101755		42	12
10988	L101772		79	31
10988	L101773		97	1
10988	L101792		91	61
10988	L101801	3120-01-102-1927	91	55
10988	L101844	5365-01-171-8054	91	31
10988	L101874	4720-01-113-2040	19	24
10988	L101877	6680-01-100-7437	97	2
10988	L101879		91	56
10988	L101888		91	41
10988	L101902	5340-01-105-2192	91	50

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10988	L101909	3930-01-168-9546	91	29
10988	L101919		91	53
10988	L101948		91	62
10988	L101974	5925-01-105-0928	34	40
10988	L101993	5925-01-105-0926	34	35
10988	L101994	5925-01-105-0927	34	25
10988	L102542	4710-01-101-0183	20	11
10988	L102543		20	10
10988	L102555	5330-01-103-1788	20	4
10988	L102599		91	17
10988	L102604	5315-01-102-1949	91	49
10988	L102605		94	2
10988	L102625		57	7
10988	L102627		57	22
10988	L102648		91	5
10988	L102649	4720-01-101-5249	94	1
10988	L102669		79	24
10988	L102674		91	14
10988	L102677		91	6
10988	L102680		79	29
10988	L102687	5306-01-101-8521	91	27
10988	L102688	3930-01-168-9545	91	44
10988	L102690	2510-01-185-3881	78	1
10988	L102694		94	8
10988	L102695	4710-01-210-0482	94	5
10988	L102703		78	3
10988	L102711		94	24
10988	L102712		94	21
10988	L102732	3020-01-161-7799	91	12
10988	L102738	3040-01-115-0904	91	43
10988	L102741		82	59
10988	L102743		82	13
10988	L102745		82	3
10988	L102746		82	36
10988	L102747		82	19
10988	L102749	4720-01-101-5250	94	29
10988	L102750	4720-01-101-5251	94	30
10988	L102751	4720-01-101-5254	94	14
10988	L102753	4720-01-101-5252	94	28
10988	L102754	4720-01-101-5253	94	25
10988	L102763		94	11
10988	L102764		94	10
10988	L102765		94	17
10988	L102766		94	16
10988	L102791		85	3
10988	L102792	5315-01-102-1948	90	23
10988	L102797		91	35
10988	L102816		25	4
10988	L10283	4730-00-435-9369	13	16
			23	2
10988	L102863	4730-01-101-1594	76	28

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	L102872		82	21
10988	L102873		36	1
10988	L102885		36	6
10988	L102886		34	31
10988	L102899		67	18
10988	L102921		81	2
10988	L102958	2930-01-101-7427	26	28
10988	L102967		26	4
10988	L102985	2510-01-215-1700	81	20
10988	L102997		81	6
			81	21
10988	L102998		81	25
10988	L103015	6140-01-115-0858	42	3
10988	L103016	2590-01-100-9292	43	1
10988	L103017	2920-01-101-1551	35	4
10988	L103019	6150-01-115-0846	35	1
10988	L103033	2540-01-158-8805	80	1
02210	L103034	2930-01-101-3047	26	7
10988	L103039		26	3
10988	L103168		89	6
10988	L103170		89	10
10988	L103172		89	13
10988	L103174		89	16
10988	L103200	4720-01-103-8947	72	18
10988	L103202		72	13
10988	L103203	4710-01-171-6971	72	11
10988	L103206		72	23
10988	L103207	4710-01-171-6972	72	21
10988	L103208		72	3
10988	L103209	4710-01-171-5198	72	1
10988	L103211	4710-01-172-0884	72	7
			72	9
10988	L103222		95	16
10988	L103223		95	15
10988	L103224		76	45
10988	L103225		76	42
10988	L103226		76	41
10988	L103227		76	38
10988	L103238		89	4
10988	L103239		89	8
10988	L103240		89	11
10988	L103241		89	14
10988	L103243		34	53
10988	L103246		76	55
10988	L103247		76	54
10988	L103248		76	59
10988	L103249		76	58
10988	L103250		76	36
10988	L103251		76	33
10988	L103252		76	32
10988	L103253		76	29

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10988	L103276	4720-01-101-5235	76	2
10988	L103282		76	47
10988	L103283		76	46
10988	L103284		95	30
10988	L103285		95	29
10988	L103299		26	5
10988	L103336		76	75
10988	L103337		76	72
10988	L103338	4720-01-101-5236	95	47
10988	L103339	4720-01-101-5237	95	46
10988	L103364	4720-01-101-5244	95	58
10988	L103365	4720-01-101-5241	95	39
10988	L103366	4720-01-101-5242	95	37
10988	L103367	4720-01-101-5245	95	20
10988	L103368	4720-01-101-5240	95	41
10988	L103385	5340-01-105-2267	58	5
10988	L103388		95	2
10988	L103389		95	1
10988	L103397	5330-01-102-0347	75	36
10988	L103401	4010-01-163-6006	80	4
10988	L103442	5360-01-103-0251	70	7
10988	L103476		42	8
10988	L103477	5315-01-101-8216	79	41
10988	L103506	4730-01-172-2677	95	42
10988	L103508	4720-01-101-5246	95	21
10988	L103512	4720-01-101-5243	95	43
10988	L103539		58	10
10988	L103593		57	24
10988	L103595		57	25
10988	L103596		57	30
10988	L103599		57	42
10988	L103600		76	18
10988	L103601		76	17
10988	L103602		76	8
10988	L103603		76	7
10988	L103638		70	13
10988	L103663	4720-01-106-0317	72	6
10988	L103692		58	9
10988	L103697	3120-01-102-0378	58	11
10988	L103728	4710-01-101-0734	59	10
			59	11
10988	L103729		59	5
10988	L103730		59	4
10988	L103731	4720-01-104-4032	59	8
10988	L103754	4720-01-101-5238	76	25
10988	L103755	4720-01-101-5239	76	24
10988	L103776		91	63
10988	L103919	2510-01-157-7996	82	58
10988	L103921		82	29
10988	L103923		34	62
10988	L103924		34	61

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	L103925		34	60
10988	L103926		34	59
10988	L103927		34	58
10988	L103928		34	57
10988	L103929		34	56
10988	L103930		34	55
10988	L103931		34	54
10988	L103932		78	15
10988	L103933		34	52
10988	L103934		34	51
10988	L103935		82	26
10988	L103936		79	18
10988	L103937		91	2
10988	L103938		79	34
10988	L103939		82	60
10988	L103941		91	7
10988	L103942	9905-01-171-2858	79	10
10988	L103943		82	18
10988	L103944		97	13
10988	L103945		79	25
10988	L103946		26	26
10988	L103947		79	35
10988	L103962	5365-01-102-0775	91	90
10988	L103982		79	11
10988	L103993		82	6
10988	L104008		78	6
10988	L104014		78	11
10988	L104018	5315-01-101-8217	91	70
10988	L104019	5340-01-102-1988	91	69
10988	L104049		76	69
10988	L104053		58	2
10988	L104074		78	13
10988	L104075		58	8
10988	L104080	5340-01-102-5861	84	5
10988	L104126	6680-01-100-7436	49	23
10988	L104127		49	18
10988	L104131	4730-01-101-7364	94	31
10988	L104132	4720-01-101-5247	95	40
10988	L104133	4720-01-101-5248	95	38
10988	L104167	2540-01-101-1636	84	4
10988	L104168	2510-01-187-6517	84	3
10988	L104197	5310-01-102-5587	91	19
10988	L104212		57	2
10988	L104265		19	2
10988	L104297		79	36
10988	L104298		97	11
10988	L104387	5365-01-109-4251	91	84
10988	L104714	4720-01-159-7979	18	5
10988	L104717	2510-01-169-1989	42	2
10988	L104840		25	18
10988	L104841	5340-01-160-2154	25	15

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10988	L104941		97	19
10988	L105181		91	77
10988	L105182	3930-01-168-9548	91	79
10988	L105183	3930-01-168-9547	91	78
10988	L105492		83	15
10988	L107964	5310-01-151-9290	91	11
10988	L111149	4720-01-159-8638	95	60
10988	L111150	4720-01-159-7694	95	62
10988	L111151	4720-01-161-2046	95	59
10988	L111152	4720-01-159-7695	95	61
10988	L111276	3020-01-172-2787	91	24
10988	L111421	3020-01-159-7835	91	92
10988	L111987	3040-01-103-3426	24	18
10988	L11247	5340-00-617-7909	19	15
10988	L11465	5365-01-208-6854	81	14
10988	L13111		57	26
10988	L13809	4720-01-204-9534	26	15
10988	L14542	6140-01-114-6623	42	6
10988	L16409	2920-01-101-7357	41	7
10988	L18331	5975-00-451-5001	21	1
			76	26
			76	63
10988	L25930		95	56
10988	L36257	4330-01-159-5840	21	
10988	L36258	3930-01-158-9369	91	
10988	L36259	3930-01-171-4504	91	
10988	L36260	3930-01-171-4503	94	
10988	L36272		92	
10988	L40793	2920-01-084-0500	32	1
10988	L47224		79	28
10988	L47464	4720-01-107-2348	49	22
10988	L47997	5340-01-057-8075	79	38
10988	L49736		67	17
10988	L50641		26	21
10988	L53739	4820-01-056-2935	20	14
10988	L58147		95	51
10988	L60008	5305-01-102-0311	79	19
10988	L60072	2520-00-598-9546	61	7
10988	L60099	5315-01-101-8213	79	1
10988	L60129		89	17
10988	L60132		79	32
10988	L60172		89	3
10988	L60186		63	50
			65	50
10988	L60200		79	21
10988	L60302	5315-01-101-8215	77	24
10988	L60451		63	44
10988	L60490	5930-01-006-2434	34	44A
10988	L60497		76	6
10988	L60515		65	44
10988	L60520		76	23

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10988	L60551	3120-01-102-0379	79	22
10988	L60747	4710-01-159-7977	94	35
10988	L60749	4710-01-159-9811	94	34
10988	L60751	4730-01-160-9129	94	32
10988	L60834	2590-01-101-0230	44	1
10988	L70914		24	6
10988	L71193		24	5
10988	L73462		24	16
10988	L73576	5905-01-086-7048	34	6
			44	12A
10988	L74168	3040-01-120-8548	91	76
10988	L74248		20	6
10988	L76365	4730-01-101-2815	72	20
10988	L76372	5315-01-172-6488	70	26
10988	L77124		97	6
10988	L77125		97	4
10988	L77590	5330-01-084-8283	40	6
10988	L77755		24	27
10988	L78045	5310-01-102-0333	97	8
10988	L78367	3040-01-101-7500	57	35
10988	L78455	5310-01-102-1884	1	8
10988	L78902		7	6
10988	L79116	5360-01-102-1978	24	11
06388	MG307FF	3110-00-953-4495	91	32
81349	MILB11743		83	19
97539	MN-1030B	5930-00-574-2151	36	4
			39	5
96906	MS15003-1	4730-00-050-4208	77	3
			79	16
			91	75
			96	15
96906	MS15003-2	4730-00-172-0022	90	5
96906	MS15003-4	4730-00-172-0028	70	21
96906	MS15003-6	4730-00-172-0034	61	2
			79	3
			91	57
96906	MS16562-39	5315-00-844-6796	5	16
96906	MS16562-68	5315-00-844-3665	79	42
96906	MS16624-1093	5365-00-804-2027	17	81
96906	MS16624-1150	5365-00-803-7299	91	71
96906	MS16624-1168	5365-00-803-7321	46	30
96906	MS16624-1196	5365-00-514-0362	48	58
96906	MS16624-1215	5365-00-282-1831	48	84
96906	MS16624-1350	5365-00-804-2192	92	8
96906	MS16625-1102	5365-00-721-4828	77	5
96906	MS16625-1162	5365-00-804-2782	46	42
96906	MS16625-1200	5365-00-804-2784	96	3
			96	13
96906	MS16997-169	5305-01-025-4832	91	30
96906	MS16997-30	5305-00-978-9368	17	110
96906	MS16997-57	5305-00-978-9377	91	66

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96906	MS17829-3C	5310-00-689-3877	40	9
96906	MS18154-113	5305-00-915-8087	67	3
			83	12
96906	MS18154-58	5305-00-115-9526	30	13
			38	11
			72	17
96906	MS18154-59	5305-01-010-2362	8	16
			69	3
96906	MS18154-60	5305-00-942-2196	8	6
			13	18
			19	16
			24	17
			24	24
			25	8
			26	1
			27	1
			44	25
			47	11
			58	16
			72	33
			76	80
			82	12
			82	14
			82	34
			82	61
			91	95
			95	52
			95	57
96906	MS19059-2414	3110-00-100-6151	74	28
96906	MS19059-2416	3110-00-100-6153	74	35
96906	MS19059-2418	3110-00-100-6155	48	78
96906	MS19059-2424	3110-00-100-6159	55	24
96906	MS19059-87		74	23
96906	MS19059-89		74	25
96906	MS19061-7	3110-00-900-2560	47	18
96906	MS20913-6S	4730-00-221-2140	20	15
96906	MS21318-27	5305-00-253-5618	2	5
96906	MS21318-7	5305-00-253-5606	17	101
96906	MS24523-22	5930-00-683-1628	34	34
96906	MS24665-132	5315-00-839-2325	89	19
96906	MS24665-281	5315-00-839-2326	91	48
96906	MS24665-283	5315-00-842-3044	58	17
			67	13
96906	MS24665-351	5315-00-839-5821	70	23
96906	MS24665-353	5315-00-839-5822	58	13
96906	MS24665-355	5315-00-012-0123	10	20
96906	MS24665-362	5315-00-298-1498	60	10
96906	MS24665-368	5315-00-236-8357	82	44
96906	MS27144-2	5935-00-115-2307	43	18
96906	MS27183-11	5310-00-809-3078	5	7
			18	8

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS27183-11	5310-00-809-3078	32	5
			91	82
96906	MS27183-13	5310-00-087-7493	25	19
			30	3
			57	27
			70	10
			76	13
			76	67
			81	13
			82	55
			84	2
			85	2
			95	25
96906	MS27183-14	5310-00-080-6004	8	26
			13	2
			13	6
96906	MS27183-15	5310-00-809-4061	8	23
			24	8
			25	7
			26	20
			28	26
			45	4
			58	14
			67	14
			76	78
			79	6
			81	3
			82	4
			82	9
			82	10
			82	16
			82	32
			82	52
			82	62
			95	50
			95	55
			97	15
96906	MS27183-16	5310-00-809-4085	34	48
96906	MS27183-18	5310-00-809-5998	82	25
96906	MS27183-19	5310-00-809-3079	42	9
			57	4
			57	8
			58	12
			75	37
			78	7
			79	14
96906	MS27183-21	5310-00-823-8803	89	7
96906	MS27183-23	5310-00-809-8533	91	26
96906	MS27183-24	5310-00-809-8536	80	2
96906	MS27183-4	5310-00-950-1310	91	89
96906	MS27183-41	5310-00-765-3197	74	66

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96906	MS27183-9	5310-00-823-8804	24	26
			35	2
			82	42
96906	MS28775-220		48	74
96906	MS35000-3	6140-00-057-2554	42	4
96906	MS35190-272	5305-00-088-8332	40	5
96906	MS35190-273	5305-00-958-5471	82	49
96906	MS35190-278		31	33
96906	MS35190-288	5305-00-958-5245	10	28
96906	MS35190-296	5305-00-957-6642	81	29
96906	MS35206-243	5305-00-984-6191	38	9
96906	MS35265-68	5305-00-846-0129	17	1
96906	MS35265-81	5305-00-622-9483	33	34
96906	MS35265-96		87	15
		5305-00-619-2322	88	27
96906	MS35266-62	5305-00-803-9742	33	61
96906	MS35333-38	5310-00-559-0070	17	7
96906	MS35333-41	5310-00-167-0721	74	73
96906	MS35335-34	5310-00-514-6674	9	4
96906	MS35335-35	5310-00-627-6128	8	17
96906	MS35335-36	5310-00-550-3503	63	34
			65	34
96906	MS35335-39	5310-00-800-0695	5	2
			5	14
96906	MS35336-27	5310-00-194-9211	10	27
96906	MS35338-42	5310-00-045-3299	32	11
			55	27
96906	MS35338-43	5310-00-045-3296	24	12
			24	19
			33	39
			33	45
			33	63
			34	2
			34	66
			40	2
			40	15
			70	15
			82	41
96906	MS35338-44	5310-00-582-5965	2	3
			4	11
			5	6
			5	18
			10	4
			18	7
			20	2
			31	2
			32	4
			33	33
			43	24
			43	28
			43	32

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS35338-44	5310-00-582-5965	57	18
			70	28
			81	7
			81	9
			81	18
			82	30
96906	MS35338-45	5310-00-407-9566	22	11
			23	6
			23	15
			25	14
			28	21
			29	3
			49	35
			57	28
			57	48
			59	19
			67	11
			67	20
			70	11
			74	89
			76	14
			76	66
			81	12
			82	39
			82	56
			85	17
			87	16
			88	28
			95	24
96906	MS35338-46	5310-00-637-9541	19	14
			24	15
			24	22
			25	6
			25	10
			26	2
			26	19
			27	2
			28	6
			28	24
			30	12
			32	15
			33	18
			37	12
			38	10
			41	3
			44	23
			44	27
			45	2
			45	13
			45	15
			46	2

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96906	MS35338-46	5310-00-637-9541	46	9
			47	10
			48	80
			55	2
			58	6
			59	15
			69	2
			71	32
			72	15
			76	77
			79	7
			79	39
			81	4
			82	2
			82	8
			82	11
			82	15
			82	33
			82	51
			91	21
			91	64
			95	49
			95	54
			97	16
96906	MS35338-47	5310-00-209-0965	34	47
			46	48
			48	36
			48	88
			49	7
			49	13
			54	4
			54	9
			57	40
			70	1
96906	MS35338-48	5310-00-584-5272	26	24
			39	3
			67	4
			75	38
			78	5
			79	13
			80	8
			82	23
			83	13
			84	7
			90	26
			91	40
96906	MS35338-49	5310-00-167-0680	48	90
			61	5
96906	MS35338-50		1	4
			13	12
96906	MS35338-51	5310-00-584-7888	91	9

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96906	MS35338-53	5310-00-584-7889	91	45
96906	MS35425-39	5310-00-080-8495	83	17
96906	MS35649-202	5310-00-934-9758	14	18
			24	20
			34	65
			35	3
			82	40
96906	MS35649-262	5310-00-934-9747	34	1
96906	MS35649-282	5310-00-934-9757	17	8
			31	19
			32	12
			33	15
96906	MS35650-302	5310-00-934-9751	24	2
			24	13
			40	3
			40	16
96906	MS35691-1	5310-00-851-2674	81	23
			81	28
			91	16
96906	MS35691-17	5310-00-851-2682	33	17
96906	MS35691-21	5310-00-975-2075	60	2
			61	14
			62	7
96906	MS35691-33	5310-00-834-8732	57	3
			57	33
96906	MS35691-37	5310-00-834-8734	70	25
96906	MS35691-5	5310-00-971-7989	57	13
			57	39
			70	5
			70	18
96906	MS35756-6	5315-00-616-5514	10	11
96906	MS35756-9	5315-00-616-5525	9	2
96906	MS35770-1	6620-00-841-1892	27	5
96906	MS35810-2	5315-00-610-5729	57	10
			89	18
96906	MS35810-3	5315-00-754-0848	57	37
96906	MS35810-4	5315-00-815-8840	67	15
96906	MS35810-6	5315-00-140-1938	70	24
96906	MS35842-12	4730-00-908-3193	49	21
			76	3
96906	MS35842-13	4730-00-909-8627	19	25
			26	8
			26	11
			76	22
03958	MS49005-10	4730-00-278-3380	45	5
			49	1
			49	10
			63	13
96906	MS49005-4	4730-00-954-1281	47	1
			48	77
			49	3

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS49005-4	4730-00-954-1281	49	30
96906	MS49005-6	4730-00-057-5555	28	2
96906	MS51074	2590-01-079-8331	41	6
96906	MS51095-369	5305-00-964-0562	8	24
96906	MS51113-1	2590-00-307-8856	34	45
96906	MS51330-1	6220-00-337-6471	38	1
96906	MS51335-2	2540-00-835-9039	80	7
96906	MS51507-A5	4730-00-869-6363	94	20
96906	MS51520A5	4730-01-123-8618	94	9
96906	MS51521A5S	4730-00-241-8349	94	27
96906	MS51522A5S	4730-00-873-3398	94	26
96906	MS51525-A12	4730-00-710-5571	59	9
96906	MS51527A6	4730-00-143-3941	76	21
96906	MS51922-17	5310-00-087-4652	13	7
			13	17
			26	12
			30	14
			91	60
96906	MS51922-33	5310-00-225-6993	57	9
			57	16
96906	MS51922-37	5310-00-067-9507	63	41
			64	14
			65	41
			66	14
			91	52
96906	MS51922-49	5310-00-269-4040	1	6
96906	MS51922-53	5310-00-225-6408	63	48
			65	48
96906	MS51922-57	5310-00-067-6356	45	6
			80	6
96906	MS51922-68	5310-00-225-6409	79	43
96906	MS51922-72	5310-00-811-1377	78	9
96906	MS51922-83	5310-00-143-6145	79	26
			91	74
96906	MS51922-9	5310-00-984-3806	25	17
			33	6
96906	MS51953-102	4730-00-196-1497	59	2
96906	MS51957-41	5305-00-054-6666	55	28
96906	MS51957-63	5305-00-050-9229	70	16
96906	MS51957-94	5305-00-051-0835	82	48
96906	MS51967-11	5310-00-880-8189	34	46
96906	MS51967-14	5310-01-070-2105	26	23
			67	5
			78	4
			79	12
			80	5
			82	24
			83	14
			84	6
			90	27
96906	MS51967-17	5310-00-763-8913	61	4

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS51967-2	5310-00-761-6882	18	6
			43	25
			43	29
			43	31
			70	27
			81	8
			81	17
			82	31
96906	MS51967-20	5310-00-763-8920	1	5
			91	86
96906	MS51967-23	5310-00-763-8921	91	37
96906	MS51967-5	5310-00-880-7744	23	7
			23	17
			25	13
			57	29
			57	49
			67	10
			67	21
			70	9
			76	15
			76	65
			81	11
			82	38
			85	16
			95	23
96906	MS51967-8	5310-00-732-0558	7	1
			8	7
			8	27
			13	13
			16	3
			19	13
			24	9
			24	14
			24	21
			25	5
			25	9
			26	17
			28	23
			33	19
			37	11
			41	4
			44	24
			44	28
			45	12
			58	7
			59	14
			72	14
			76	76
			79	40
			81	5
			82	1

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS51967-8	5310-00-732-0558	82	20
			82	50
			95	48
			95	53
			97	17
96906	MS51968-11	5310-00-880-7745	48	35
			48	89
			54	3
			63	35
			65	35
96906	MS51968-14	5310-00-732-0560	39	4
			63	15
			65	15
96906	MS51968-17	5310-00-763-8911	48	91
96906	MS51968-2	5310-00-768-0319	57	19
96906	MS51968-20	5310-00-763-8905	5	15
96906	MS51968-5	5310-00-880-7746	74	72
96906	MS51968-8	5310-00-732-0559	48	81
96906	MS51983-3	5310-00-880-2004	63	24
			65	24
96906	MS52131-1	5935-01-044-8382	35	5
96906	MS53047-1		38	8
96906	MS90725-10	5305-00-071-2241	10	3
			70	20
96906	MS90725-113	5305-00-042-6417	75	39
			78	8
			79	15
			82	22
96906	MS90725-138	5305-00-716-8211	68	13
96906	MS90725-139	5305-00-716-8200	61	6
96906	MS90725-14	5305-00-071-2237	91	83
96906	MS90725-166	5305-00-724-5913	1	9
96906	MS90725-170	5305-00-724-5936	1	1
96906	MS90725-19	5305-00-071-2232	91	20
96906	MS90725-192	5305-00-042-9479	91	38
96906	MS90725-195	5305-00-939-7063	45	11
96906	MS90725-3	5305-00-068-0500	2	4
			5	19
96906	MS90725-31	5306-00-225-8496	49	36
			74	90
96906	MS90725-32	5306-00-225-8497	23	5
			29	2
			57	43
			59	20
			82	57
96906	MS90725-33	5306-00-225-8498	22	10
96906	MS90725-34	5306-00-225-8499	25	16
			25	20
			57	34
			70	17
96906	MS90725-36	5305-00-225-9081	76	11

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS90725-36	5305-00-225-9081	84	1
96906	MS90725-39	5306-00-225-8503	81	16
96906	MS90725-43	5305-00-225-8507	85	1
96906	MS90725-50	5306-00-225-8514	42	1
96906	MS90725-6	5305-00-068-0502	5	5
			10	26
			32	3
			43	22
			43	26
			43	34
			82	27
96906	MS90725-62	5305-00-269-3213	8	25
			26	22
			41	1
			44	21
			46	1
			46	8
			71	33
			79	8
			81	10
			82	5
			82	7
			82	53
			91	55
96906	MS90725-64	5305-00-269-3214	8	22
			13	1
			25	12
			26	27
			58	4
			59	17
			82	37
			97	14
96906	MS90725-65	5305-00-269-3215	45	1
96906	MS90725-66	5305-00-269-3216	8	9
			32	14
96906	MS90725-67	5305-00-269-3217	28	30
96906	MS90725-69	5305-00-269-3219	8	20
			28	7
			28	19
96906	MS90725-70	5305-00-269-3220	8	21
			24	7
			28	25
			30	8
			91	58
96906	MS90725-72	5305-00-269-3222	7	9
			7	20
96906	MS90725-73	5305-00-269-3223	55	1
96906	MS90725-8	5305-00-225-3839	18	9
			20	1
			70	3
			70	8

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS90725-89	5305-00-050-1076	49	8
			57	41
96906	MS90725-90	5305-00-042-9478	67	19
96906	MS90725-94	5305-00-069-5578	47	20
96906	MS90725-99	5305-00-069-5583	54	2
96906	MS90726-107	5305-00-716-8192	91	39
96906	MS90726-41	5306-00-225-9096	74	75
96906	MS90726-64	5305-00-269-2807	45	16
96906	MS90727-113	5305-00-719-5221	63	39
			65	39
			96	22
96906	MS90727-163	5305-00-726-2550	77	21
96906	MS90727-189	5305-00-762-6041	90	3
			93	16
96906	MS90727-58	5305-00-269-3234	46	27
			68	12
96906	MS90727-89	5305-00-709-8539	5	13
96906	MS90728-101	5305-00-071-2064	54	1
96906	MS90728-113	5305-00-071-2069	63	3
			65	3
96906	MS90728-114	5305-00-071-2070	26	25
			90	25
96906	MS90728-116	5305-00-071-2072	80	9
96906	MS90728-120	5305-00-071-2076	57	5
96906	MS90728-121	5305-00-071-2077	57	23
96906	MS90728-125	5305-00-071-2081	2	31
96906	MS90728-13	5305-00-071-2510	81	22
			81	26
96906	MS90728-185	5305-00-900-1118	45	9
96906	MS90728-190	5305-00-947-4353	80	3
96906	MS90728-30	5306-00-226-4823	28	20
96906	MS90728-38	5306-00-226-4831	95	28
96906	MS90728-6	5305-00-068-0508	4	12
96906	MS90728-8	5305-00-225-3843	4	13
96906	MS90728-83	5305-00-071-1784	49	12
96906	MS90728-86	5305-00-071-1787	34	49
			46	47
			70	2
96906	MS90728-89	5305-00-071-2055	63	4
			64	33
			65	4
			66	33
96906	MS90728-92	5305-00-071-2058	63	2
			65	2
96906	MS9176-20	5340-01-090-8909	2	24
			3	10
96906	MS9176-30	5340-00-939-1101	3	18
96906	MS9176-31		2	33
96906	MS9226-07	9505-00-962-7242	91	4
96906	MS9245-27	5315-00-881-2705	57	11
			57	36

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10988	M20611	5330-00-411-9136	0007	33
74400	M4010	5930-00-879-3593	41	5
74400	M4183	6210-00-006-9781	34	15
80205	NAS561P4-6	5315-00-238-1584	10	13
00624	NH102300-0150	4730-00-391-3735	7	5
10988	NSS		3	13
			15	12
			19	5
			56	4
			56	8
			68	5
70960	NUSL20-18-1	5310-01-058-3772	60	9
10988	N6344	2590-01-106-3971	74	77
70040	P/N5651834		21	2
18265	P00-2940	5340-00-009-5294	19	11
18265	P10-0089		19	17
18265	P10-2144	5310-00-735-3544	19	8
18265	P10-2510		19	9
18265	P10-3198	2940-00-832-8729	19	12
18265	P10-3836	2940-01-172-0660	19	10
18265	P10-5289	2940-00-163-4727	19	6
18265	P13-8600		19	7
91816	P59-500	4820-01-120-4532	12	
61112	QA1-2TC		23	9
61112	QK-1027-B51		23	8
61112	QS1-2TC		23	12
10988	R-28970	4720-01-106-0798	76	53
18265	RAX00-2352	2940-01-012-4888	19	23
59730	RB2237	5940-01-078-2936	44	5
78500	RV7812		64	11
			66	11
10988	R15257	5340-00-345-2615	59	16
10988	R17756	5340-01-105-2190	90	24
10988	R24718	5365-00-288-3996	57	20
80194	S-210281	4710-01-122-9664	64	8
55524	S-24-100	2940-01-158-4608	97	18
81343	SAEB104		34	32
			41	9
			43	21
			44	2
81343	SAEB106		34	33
81343	SAEB107		41	8
			44	4
81343	SAEB203		44	19
81343	SAEB207		44	3
81343	SAEB305		44	8
81343	SAEB306		44	20
81343	SAEB309		32	2
81343	SAETYPE1-180DIA1 2-20AWG		44	7
81343	SAETYPE10-156DIA 12-20AWG		43	5

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
81343	SAETYPE10-156DIA 12-20AWG		44	6
78500	SC-716	5307-00-812-7042	63	25
			65	25
02695	SF32RTC	3130-01-006-3356	61	3
77820	SG3106-E28-51S	5935-00-226-2713	43	2
01428	SPG1000CP	3040-00-150-7188	24	10
01428	SPG1002	3040-01-189-8962	57	15
91637	SPR-101440OHM10%	5905-01-086-7048	43	15A
06383	SST-2-S		57	46
06383	SST2I-CO	5975-01-142-6169	30	11
			34	39
			43	30
			44	31
			72	30
78500	S210281		66	8
10988	S220044		92	21
03481	S25B391	5310-00-155-4915	20	5
10988	S64595		92	22
10988	S92653		92	17
			92	26
10988	T-11232	5315-01-104-6068	82	43
84971	TA021 24 CO-18NB		59	18
10988	T11032		92	6
			92	35
10988	T30271-1	5330-01-126-1234	74	80
32828	T7-11P2	3110-01-105-1929	91	33
43334	U5206TM	3110-00-277-0032	91	13
17875	VS-900-572C-03	2640-01-078-1870	73	2
02249	V20-546-A		85	4
70960	WAFR24-5		61	16
			62	9
70960	WAR20-1	5310-01-057-8077	60	8
70960	WAR23-1		61	15
			62	8
70960	WSP1-76-1		60	7
			61	11
			62	6
81348	WW-P-471ACABUD	4730-00-289-5176	28	29
92865	X-1751-1		71	25
92867	X10733	2590-01-125-4242	67	1
92865	X2140-1		71	9
92865	X2140-2	5340-01-109-7060	71	14
92865	X2140-3		71	6
92865	X2140-4		71	7
92865	X2140-5		71	2
92865	X2140-6		71	12
14351	X27019494	3030-00-834-4915	30	7
81348	ZZ-T-381/15-19.5 /GP3A/D/TBND	2610-01-159-1864	73	4
			73	4

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
76385	Z440		42	7
57013	0-050014-0	6350-01-113-8974	41	2
16764	001481	5945-00-843-1778	32	6
92867	01197900	2530-01-107-8261	67	6
92865	02-400-076			
92865	02-460-334			
77640	020168	5305-00-333-9535	74	84
77640	021296	5305-01-110-7902	74	3
77640	026045	5310-00-637-1204	74	76
74687	028-561	5340-01-092-1637	82	46
04994	028395	5310-01-099-7905	74	7
77640	028415	5310-01-109-9405	74	44
77640	029031	5999-00-374-0826	74	94
77640	029037	5999-00-215-4048	74	101A
77640	029039	5310-00-735-1273	74	100
92865	03-640-195A	2520-01-200-5636	70	12
77640	032089	5940-00-549-9553	74	78
77640	032156	5977-00-578-6495	74	67
77640	032229	5330-01-135-4807	74	19
73740	032262	5940-00-430-7474	74	82
77640	032305	5330-00-350-6348	74	39
77640	032356	5330-00-455-2666	74	45
04994	032430	5330-01-100-5100	74	48
04994	032498-1	5330-01-099-8851	74	30
04994	032535	5330-01-099-8690	74	42
77640	032621	5330-01-081-0468	74	9
77640	033157		74	52
77640	033158		74	51
77640	033159		74	50
77640	033160		74	49
77640	034031	5330-00-735-1272	74	65
77640	036138		74	20
77640	036147		74	31
77640	036147-A1	2530-01-124-9373	74	29
77640	040050		74	88
77640	040070		74	41
77640	040111		74	6
77640	040113	3110-01-109-5516	74	26
99699	0460-201-1690		43	13
99699	0461-201-1690		44	14
77640	051036	5970-00-561-9511	74	79
			74	98
02249	0562-001		87	27
77640	063024	2530-00-786-0222	74	85
77640	063979	3110-00-036-6843	74	55
77640	063980		74	69
10988	0756-BL	5306-01-109-4109	67	16
04994	089181	2530-01-099-4408	74	59
77640	096295-A1	4730-01-205-7781	74	68
77640	099077		74	8
11897	101-BB-1113		91	18

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10988	102780		34	50
16528	1030004	6220-00-678-9046	37	1
84760	10373	3040-00-646-6810	17	75
84760	10394	9905-00-473-6379	17	102
84760	10408	5340-00-335-9299	16	1
			17	148
84760	10453	5330-00-757-1680	17	124
84760	10519	5330-00-877-4972	17	125
02249	1052-6782-038		85	11
84760	10529	5310-00-115-6223	17	118
84760	10534	5310-00-407-5575	17	119
84760	10541	5360-00-887-1536	17	121
84760	10567	2910-00-787-6422	17	99
84760	10574	5330-00-506-3975	17	100
84760	10584	5305-00-787-6468	17	98
83299	1060371	5360-00-629-6190	68	6
10119	10924S1-10	2520-01-102-3832	59	1
04963	1099	8040-01-126-1422	BULK	1
12603	11F8	4730-00-801-8186	47	28
			47	31
16764	1105510	6115-01-102-3063	31	3
84760	11067	5340-01-159-8534	17	67
16764	1109051	6110-00-278-1044	32	13
09505	111-B 1/8-27NPT	4730-00-350-9619	19	21
10988	111-118	5306-01-110-7893	83	16
84760	11141	5315-00-887-1539	17	70
16764	1114390	2920-00-399-8296	33	8
16764	1116388	2920-01-036-7354	31	5
84760	11175	5305-00-207-3984	17	73
84760	11196	5360-00-884-8209	17	72
84760	11208	5365-00-786-4027	17	60
84760	11212	5365-00-786-3964	17	61
11139	112263-90	5310-01-086-7726	43	9
11139	112264	5310-01-081-0799	43	11
11139	112349	5999-01-085-6244	43	14
11139	112352	5999-01-081-9032	44	15
10988	113-695	5306-01-209-7094	97	9
84760	11304	5330-00-641-8291	17	74
84760	11329	5330-00-853-2376	17	51
84760	11331	5306-00-819-3038	17	135
84760	11346	4730-00-335-9315	17	69
99699	114017		43	10
			44	17
84760	11437	2910-00-887-1546	17	65
84760	11438	5305-00-887-1547	17	64
84760	11439	2910-00-887-1548	17	66
84760	11507	5330-00-641-8283	17	40
			17	87
84760	11508	5315-00-321-8737	17	42
84760	11525	5365-00-992-7084	17	52
84760	11582	5310-00-796-8638	17	2

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
84760	11582	5310-00-796-8638	17	45
84760	11588	5330-00-641-8286	17	104
84760	11610	5365-00-877-4952	17	132
84760	11611	2910-00-128-1185	17	20
84760	11620	3120-00-294-2219	17	82
84760	11643	2910-00-336-8032	17	84
19207	11677308	2590-01-093-4152	74	92
08723	117		83	8
84760	11900	2990-00-459-7136	17	138
84760	11901	2990-00-786-3968	17	137
84760	11919	5360-00-335-9327	17	136
84760	11966	5360-00-816-8227	17	129
84760	11969	2990-00-786-6341	17	130
78500	1199K1493		64	4
			66	4
78500	1199Q2981	5330-01-052-5759	BULK	2
78500	1199R2176	5315-00-880-6027	64	51
			66	51
30780	12S5BXS		76	68
84760	12019	2910-00-127-5073	17	108
16764	120361		33	46
84760	12040	5330-00-641-8282	17	17
			17	22
84760	12054		17	14
78189	1210-00	5310-00-193-7486	17	6
84760	12106		17	11
84760	12169	5305-00-786-4033	17	106
84760	12174	5310-00-935-1243	17	107
			17	116
84760	12208	2910-00-788-0988	17	25
84760	12210	5340-00-787-6424	17	128
84760	12214	2910-00-335-9331	17	103
84760	12216	5305-00-887-1564	17	63
84760	12221	2910-00-788-0989	17	15
84760	12253	2910-00-972-7959	17	16
78500	1227-C-939	5310-01-109-6056	64	31
			66	31
78500	1227F162	5310-00-359-1192	63	28
			63	30
			65	28
			65	30
78500	1228H268	3110-00-432-4596	64	47
			66	47
84760	12288	5310-00-791-9437	17	105
78500	1229-V-1504	5310-01-109-4250	63	16
			65	16
78500	1229C1511		63	6
			63	40
			64	13
			64	18
			65	6

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
78500	1229C1511		65	40
			66	13
			66	18
78500	1229E1331	5310-00-286-3727	64	30
			66	30
78500	1229E1513	5310-00-411-5241	63	5
			64	32
			65	5
			66	32
78500	1229R720		63	27
			65	27
78500	1229S721	5310-00-359-1334	63	29
			65	29
78500	1229U1061	5310-00-522-5899	64	23
			66	23
78500	1229U1503	5310-00-953-5023	64	7
			66	7
78500	1229W1167	5365-01-005-6678	64	48
			66	48
78500	1229Y883	5365-00-661-3768	64	21
			66	21
84760	12358	2910-00-788-0986	17	141
84760	12360	5305-00-250-5613	17	139
84760	12362	5310-00-400-8585	17	140
84760	12406	5330-00-171-5641	17	37
78500	1246B288	5315-00-752-1651	63	11
			65	11
78500	1246X232	5365-00-386-9554	63	33
			65	33
84760	12480	5360-00-691-7207	17	144
84760	12500	5310-00-830-7825	17	10
84760	12513	5365-00-786-4025	17	145
77890	1255DX	4140-01-104-0688	29	1
84760	12622	5310-00-787-6466	17	26
84760	12637	2910-00-787-6428	17	91
84760	12640		17	34
84760	12686		17	28
84760	12741	5365-00-786-6343	17	29
84760	12743		17	30
84760	12745	2910-00-980-2301	17	31
84760	12764	5330-00-974-6643	17	32
			17	95
84760	12765		17	89
84760	12766	5330-00-936-4587	17	90
84760	12952		17	112
84760	12966	5330-00-877-4960	17	48
84760	12972	5305-00-891-8979	17	117
10988	13-16100	5305-01-102-1867	78	12
10988	13-512	5306-01-067-6998	94	36
10988	13-536	5306-01-209-9284	67	12
84760	13003	5360-00-751-8916	17	113

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84760	13010	5340-00-786-1550	17	114
10988	131-1333	5310-01-101-8557	91	46
70485	1326W	5340-00-006-8209	81	27
84760	13556		17	24
10988	138-159		91	80
10988	138-56	5315-00-582-2466	91	68
84760	13807	5310-00-891-5703	17	21
84760	13819		17	59
84760	13820		17	59
84760	13837	5305-00-786-4032	17	56
84760	13839	5360-00-784-0330	17	58
10988	141-60		58	1
84760	14408	5310-00-877-4956	17	18
84760	14482	2990-00-897-2539	17	126
84760	14483	3120-00-886-6208	17	83
84760	14565		17	65
02249	1458-001		88	14
84760	14675		17	23
84760	14680	2910-00-897-2466	17	131
84760	14846		17	85
78500	15X-1083	5305-01-100-6630	64	17
			66	17
78500	15X-1325-S	5305-01-114-3776	64	12
			66	12
79807	15000	5310-01-103-5746	96	21
84760	15093	3120-00-993-4152	17	86
10988	151-525	5320-01-085-1635	78	2
10988	151-532		26	6
			79	17
			91	1
10988	151-539		34	63
			78	14
			82	17
10988	151-544		79	9
			97	12
			97	20
02249	1522-8120-019		86	1
02249	1522-8133-031		88	
02249	1522-8134-183		87	
84760	15225	2910-00-898-4926	17	38
84760	15228	4730-00-459-6077	17	35
27007	15471-28		75	22
75915	155-120		43	15
			44	12
84760	15627	5310-00-898-4927	17	39
84760	15668	5305-01-101-9433	17	115
84760	15699	5360-00-900-2564	17	53
84760	15701	5360-00-930-9363	17	41
84760	15750	5330-00-061-8538	17	93
15434	158208	5310-00-486-2506	7	10
			7	10

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
84760	15875	2910-00-901-0753	17	50
84760	15877	2990-00-459-7135	17	47
12603	16F-01		55	21
99984	1600	5315-00-182-4127	79	23
27007	16006-13		75	23
27007	16015-59-90	5330-01-101-8173	75	9
27007	16028-716		75	12
34662	1604-187-Y	5340-00-598-6653	2	14
27007	16096-112	5365-01-186-0813	75	35
70960	1610-BL	4730-00-050-4208	62	1
70960	1610BL	4730-00-050-4208	60	6
			61	8
			61	13
			62	5
27007	16103-12		75	3
27007	16133-12		75	4
84760	16135		17	109
84760	16136	2910-00-127-5075	17	111
02249	1615-001		86	3
84760	16159	2910-00-155-3194	15	4
84760	16168	5310-00-022-0666	15	11
84760	16279	5315-01-110-7836	17	19
84760	16369	5330-00-401-5247	17	149
84760	16389	5365-00-022-0665	15	10
84760	16396	5365-00-209-3148	17	143
10988	164-226	5305-01-125-1997	91	88
84760	16440	2910-00-897-2461	17	57
10988	166-24	5306-01-129-9787	74	46
10988	166-51	5306-01-126-1169	75	29
10988	166-53	5306-01-125-1989	75	28
08108	1662	6240-00-877-3405	39	2
84760	16753	2910-00-192-9259	17	55
10988	168-73		91	8
08806	1683	6240-00-044-6914	37	14
10988	169-77	5305-01-102-2661	32	9
84760	17056	2910-00-901-0749	17	43
84760	17058	4730-00-897-2460	17	36
76700	17123NREVA	2990-01-103-3422	25	3
02249	1718-001		86	5
78500	1718D108	5340-00-217-9599	69	9
84760	17195	5365-00-043-1520	14	22
84760	17199	2910-00-421-9518	14	23
02249	1726-001		86	9
10988	173-102	5305-01-101-9423	14	15
10988	173-243	5305-01-102-2663	81	15
84760	17451	5365-00-556-7446	17	49
84760	17506	5305-01-055-6736	17	44
84760	17513	5330-00-492-8856	17	78
10988	177GD	5360-01-172-6494	94	3
84760	17720	5310-00-235-9653	14	6
84760	17721	5365-00-470-8133	14	5

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78500	1779W49	5315-00-217-9576	69	4
84760	17971	5310-00-451-1688	15	8
84760	17997	5360-01-102-0740	17	127
84760	18053	2910-01-075-1877	15	2
78500	1807A1	5340-00-217-9575	69	6
02249	1808-001		87	13
			87	18
			88	25
02249	1809-009		88	30
02249	1810-001		87	17
			88	29
02249	1811-001		87	14
			88	26
84760	18137	2910-00-192-9405	17	54
02249	1818-001		87	9
			88	9
		5330-01-014-7294	88	19
02249	1819-001		87	7
			88	7
		5330-01-014-7293	88	18
			88	20
10988	182-187	5305-01-102-2662	35	6
10988	182-516	5305-01-102-2659	34	29
10988	182-538	5305-01-102-2660	34	64
02249	1820-001		87	8
			88	8
02249	1821-001		87	6
			88	6
		5365-01-125-5329	88	21
06970	183-L-T-T-2-112	2520-01-106-8339	57	14
84760	18334	4730-00-450-6626	14	1
16764	1839345	3120-00-661-6764	33	2
84760	18501	5310-00-461-8858	17	4
			17	9
16764	1851612	5305-01-086-3555	31	22
16764	1851808	5310-01-047-6064	31	6
16764	1852059		31	13
84760	18525	2910-01-054-3815	17	150
16764	1852799		33	48
84760	18542	5305-01-068-5490	15	6
84760	18544	5310-01-024-3111	15	5
02249	1856-001		85	7
02249	1868-001		87	10
			88	10
10988	187-1031	5305-00-110-1533	77	12
84760	18729	2910-01-070-6652	15	7
84760	18730	5360-01-067-9764	15	3
16764	1876668	5305-01-086-1076	31	20
16764	1876681	5305-01-081-0465	31	8
16764	1877310		33	13
16764	1877313	2920-00-486-8048	33	31

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
16764	1878192	5940-01-058-6376	34	27
			34	38
			34	43
16764	1887021	2920-01-163-7872	33	42
16764	1891055	5961-01-047-6729	31	16
16764	1894559	5977-01-070-9812	31	7
16764	1894568	5940-01-117-4047	31	17
16764	1894586	5305-01-084-4431	31	10
16764	1894594	2920-01-085-7663	31	32
16764	1894597		31	31
08806	1895R	6240-01-106-2447	34	69
84760	18967	2910-00-932-4787	17	94
84760	18968	4730-01-066-5176	17	97
84760	18986	2910-01-191-8465	17	79
24617	190877	6240-00-019-0877	38	5
16764	1914580	5305-00-105-1207	33	40
16764	1914842	5310-00-178-9612	33	54
16764	1915172	5310-00-596-5152	31	23
16764	1917128	5360-00-969-0541	33	9
16764	1919149	2920-00-741-9792	33	5
16764	1919851		33	52
16764	1926618	5977-00-675-1765	33	59
74400	19269	6210-01-175-1091	34	7
16764	1928021	3120-00-888-6630	33	30
16764	1928022	5365-00-804-9666	33	29
16764	1928023	5310-00-606-6608	33	28
16764	1937310	5330-00-761-8954	33	37
16764	1940474		33	47
16764	1940475	5977-00-776-9967	33	58
16764	1940477	5977-00-893-0088	33	57
16764	1941075	5977-00-895-4138	33	44
16764	1941110		33	3
16764	1941113	2920-00-841-3254	33	26
16764	1941978	5310-00-949-9299	31	24
16764	1946143		33	16
24617	1946445	5977-00-076-9155	33	56
16764	1948202		33	12
16764	1949538		33	22
10988	195-2112	5310-01-125-6254	91	36
10988	195-518	5310-00-451-1691	83	18
16764	1950069		33	11
16764	1952505		33	23
16764	1952603		33	51
84760	19527		17	77
16764	1955499		33	24
16764	1955946		33	64
16764	1958679	5360-00-947-1184	33	25
84760	19590		17	92
16764	1959514	5305-00-900-8496	33	60
10988	196-20	5310-01-109-6757	91	85
			91	87

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10988	196-60	5310-01-102-5586	91	72
10988	196-75	5310-01-102-0329	91	73
16764	1960025	5306-00-413-9852	33	50
16764	1960244	5940-00-789-6610	33	10
84760	19603	2990-01-065-1994	17	76
			17	80
16764	1960762		33	43
16764	1961261	3020-00-925-2760	30	6
16764	1962601	2920-00-947-4676	33	7
16764	1962603	5330-00-838-1463	33	36
16764	1962606	3120-00-086-7895	33	38
16764	1965104	5305-00-989-5624	31	30
16764	1966821		33	65
76359	1967CD	5305-01-102-1854	83	2
16764	1967566	2920-00-401-0582	33	35
16764	1968396	5305-00-450-5937	33	41
16764	1969375	6105-00-414-8539	33	66
16764	1970988	5330-00-433-3808	33	4
16764	1971411	5910-01-019-6505	31	21
11862	1971993	2590-01-085-1968	31	29
16764	1974020	5305-01-118-8781	31	9
16764	1974861	3110-01-105-1210	31	28
16764	1974862	3110-01-105-1933	31	34
16764	1974941		31	12
16764	1975471	5940-01-098-7479	31	11
16764	1975635		31	15
16764	1975718	2920-01-112-3832	31	4
16744	1976138		31	25
16764	1976808		31	26
84760	19818		15	9
16764	1985348	5961-00-099-9791	31	18
			74	97
30076	199169	2530-01-099-3045	74	61
84760	19921	5315-01-102-2905	17	123
02697	2-021N674-70	5330-01-010-2428	85	10
02697	2-442N674-70	5330-01-028-0213	97	7
73992	2K16	4730-00-729-7087	75	3C
92865	20-100-065		71	1
92865	20-100-180		71	28
81343	20-20 070102CA	4730-00-202-8470	49	16
78500	20X-1556-S	5307-01-118-6441	63	23
			65	23
24207	2001	4820-01-013-9403	76	16
27007	20100-2		75	34
27007	20100-3		75	8
			75	33
27007	20100-6		75	19
27007	20100-8		75	14
			75	26
58143	20102-012-7.0	4730-01-123-6937	95	44
27007	20104-5		75	25

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84760	20113	5330-01-014-6985	17	33
			17	96
84760	20116		17	71
12603	201413	5360-00-358-8994	48	76
12603	201566	5305-00-215-7324	48	106
84760	20269	2910-01-066-4170	17	120
78500	203P6932		66	37
84760	20359	5360-01-055-4398	17	134
84760	20387	3805-01-070-0185	17	62
84760	20511	2910-01-188-3248	17	54
84760	20512	2910-01-188-3683	17	54
74400	20678	6210-01-117-2455	34	12
12603	207758	5307-01-107-3676	48	73
84760	20849	2910-01-054-3816	17	133
84760	20951	2920-01-117-3251	17	5
27007	21070-85		75	30
12603	211433	2520-00-051-9932	47	2
10988	213-2	5340-01-059-7357	57	12
10988	213-23	5340-01-102-1964	70	29
84760	21321		17	147
84760	21322		17	146
10988	214-274	4730-00-420-0828	2	7
			18	2
			18	4
			20	9
			63	46
			65	46
12603	214295	2520-00-045-4037	49	5
			49	25
12603	215160	2530-01-018-1670	68	10
12603	215183	2520-00-142-5392	48	1
			48	57
84760	21582		17	147
84760	21583		17	146
84760	21677		17	142
10988	217-1		40	11
10988	217-1015	4730-00-595-0385	20	13
10988	217-1061	4730-00-263-2733	72	29
10988	217-119	4730-00-782-5582	20	17
10988	217-294	4730-01-049-4807	14	14
10988	218-1253	4730-01-020-5607	94	4
10988	218-1254		76	27
			94	33
10988	218-1575		76	37
10988	218-341		76	9
			76	19
10988	218-342		94	6
			94	13
			94	19
			94	22
10988	218-343		76	31

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10988	218-343		76	35
			76	56
			76	60
10988	218-344	4730-00-762-1239	76	40
			76	44
10988	218-345		76	74
			95	17
10988	218-346	4730-00-812-0924	59	7
			59	13
			76	48
			95	4
			95	31
10988	218-349		49	19
10988	218-361		76	10
			76	20
10988	218-362		94	7
			94	12
			94	18
			94	23
10988	218-363		76	30
			76	34
			76	57
			76	61
10988	218-364		76	39
			76	43
10988	218-365		76	73
			95	18
10988	218-366		59	6
			59	12
		4730-01-055-4389	76	49
			95	3
			95	32
10988	218-369		49	20
10988	218-5002	5330-01-067-8572	22	3
			22	6
10988	218-5008	5330-00-760-3149	86	8
10988	218-5043	4730-01-066-0953	95	5
10988	218-5045		95	22
10988	218-5060	4730-00-998-7244	76	71
10988	218-5062	4730-00-471-0151	76	64
10988	218-5063		95	14
10988	218-5072	4730-01-055-8342	95	11
10988	218-5094		75	3A
10988	218-5107	4730-00-974-7313	76	81
			95	36
10988	218-5108	4730-00-946-7823	95	12
10988	218-5119	4730-00-370-2874	95	45
10988	218-5127	4730-01-101-9541	94	15
10988	218-5149	4730-00-395-6567	76	1
10988	218-5152	5365-00-508-8945	22	2
			48	38

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
10988	218-5158	5365-01-130-6254	75	2
10988	218-516		59	3
10988	218-5165		76	51
10988	218-5274	4730-01-007-5233	95	34
10988	218-5280		76	52
10988	218-5281	4730-01-101-7371	95	35
10988	218-5351		76	50
10988	218-5360		95	13
10988	218-5625	4730-01-101-7370	95	19
10988	218-596		95	33
10988	218-673	4730-00-826-2347	76	62
84760	21807		17	142
12603	219373	5330-00-250-2156	46	52
09505	22NSR		19	19
78500	2203A6943		64	37
			66	37
78500	2203B6944		64	37
			66	37
78500	2203B6945		64	37
			66	37
78500	2203D6946		64	37
			66	37
78500	2203E6947		64	37
			66	37
78500	2203F6948		64	37
			66	37
78500	2203G6923		64	37
			66	37
78500	2203G6949		64	37
			66	37
78500	2203H6924		64	37
			66	37
78500	2203H6950		64	37
			66	37
78500	2203J6926		64	37
			66	37
78500	2203J6952		64	37
			66	37
78500	2203K6927		64	37
			66	37
78500	2203K6953		64	37
			66	37
78500	2203L6928		64	37
			66	37
78500	2203L6954		64	37
			66	37
78500	2203M6929		64	37
			66	37
78500	2203M6955		64	37
			66	37
78500	2203N6930		64	37

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
78500	2203N6930		66	37
78500	2203N6956		64 66	37 37
78500	2203P6932		64	37
78500	2203P6958		66	37
78500	2203Q6933		64 66	37 37
78500	2203Q6959		64 66	37 37
78500	2203R6934		64 66	37 37
78500	2203R6960		64 66	37 37
78500	2203S6935		64 66	37 37
78500	2203S6961		64 66	37 37
78500	2203T6936		64 66	37 37
78500	2203T6962		64 66	37 37
78500	2203U6937		64 66	37 37
78500	2203U6963		64 56	37 37
78500	2203V6938		64 66	37 37
78500	2203V6964		64 66	37 37
78500	2203W6939		64 66	37 37
78500	2203W6965		64 66	37 37
78500	2203X2728	5365-01-020-5830	64 66	27 27
78500	2203X6940		64 66	37 37
78500	2203X6966		64 66	37 37
78500	2203Y2729	5365-01-020-9391	64 66	28 28
78500	2203Y6941		64 66	37 37
78500	2203Y6967		64 66	37 37
78500	2203Y6968		64 66	37 37
78500	2203Z2730	5365-01-020-9393	64 66	29 29
78500	2203Z6942		64 66	37 37

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
74400	22051	6210-01-117-1930	34	9
78500	2208U411	5330-00-171-4595	63	31
			65	31
10988	221-102	4730-00-828-1142	19	20
10988	221-1690	4730-01-101-7368	40	12
10988	221-32	4730-00-535-2187	2	21
10988	221-374	4730-00-043-4479	19	22
10988	221-566	4730-01-101-2813	49	15
10988	221-662	4730-00-287-3279	2	1
10988	221-677	4730-00-544-2407	97	3
84760	22124	2910-00-058-6552	17	27
78500	2214E57	5365-00-752-1779	64	50
			66	50
84760	22149	2920-01-101-2552	17	151
12603	221871	4930-01-119-4558	49	39
			55	22
10988	222-1002		72	2
			72	8
			72	12
			72	22
10988	222-1012	4730-00-540-2612	72	28
10988	222-102	5365-00-215-7421	14	4
10988	222-1022	4730-00-335-2578	72	10
10988	222-1062	4730-01-173-4170	72	4
10988	222-1071	4730-00-249-8278	72	5
10988	222-112	4730-01-044-5457	14	3
05972	222-21	8030-01-054-3968	BULK	4
10988	222-47	4730-00-377-3358	14	10
			14	13
10988	222-639	4730-01-014-1282	20	12
10988	222-72	4730-00-633-1492	14	8
12603	222067	2520-00-051-5327	49	32
			49	40
			49	41
12603	222104		48	50
12603	222179	5310-00-462-4134	48	93
			48	118
84760	22238	4820-00-432-1232	17	88
84760	22250	4820-01-101-0938	17	133
12603	222960	5310-01-018-0683	48	92
			48	119
12603	223015	4320-01-103-3314	46	41
12603	223085	2520-00-142-5385	47	13
78500	2233A105	3020-00-891-5996	64	24
			66	24
12603	223349	3110-00-554-5968	48	4
78500	2234-N-872	3020-01-209-2380	64	22
			66	22
84760	22365	2910-01-103-3390	15	1
12603	223878	5340-00-882-0739	46	4
			46	17

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
12603	223878	5340-00-882-0739	46	20
12603	223922	5365-00-713-3754	46	12
12603	223964	5365-01-018-5450	48	26
			48	29
12603	223997	5365-00-930-5143	48	68
			48	70
12603	224020	5340-00-788-2785	48	21
12603	224083	5365-00-838-8715	48	2
12603	225597	3110-00-155-6741	48	45
12603	225605	3110-01-099-7304	48	23
			48	114
12603	225843	3110-00-554-3246	48	69
12603	226862	5307-01-105-7329	48	40
			48	87
12603	226870		48	105
12603	227880		55	7
12603	227881		55	9
12603	228931		55	5
78500	229783096		64	35
			66	35
12603	23E06	5310-00-637-9541	68	11
12603	23H-504		68	8
12603	230067	5365-01-104-6200	48	71
12603	230829	3110-00-554-5675	48	10
12603	230863	2530-01-172-2778	68	1
12603	230864	2530-01-172-0664	68	9
12603	230885	3110-00-142-7005	48	25
			48	30
			48	59
12603	230889	5365-01-018-5220	48	3
12603	230954	5330-01-024-3346	48	115
12603	231136	3040-01-103-4309	48	116
12603	231390	2520-01-017-0494	46	51
12603	231624	3110-01-099-9557	47	6
12603	231776	5365-01-099-3937	47	14
12603	231877		48	75
12603	233065	5315-01-105-7362	48	17
			48	64
12603	233264		55	8
12603	233389	3110-01-052-0058	48	5
70465	2335		36	7
12603	233779	5315-01-119-5240	55	19
12603	234099	2940-01-038-2321	54	5
12603	234109	2520-01-045-8766	50	4
			51	4
			52	4
			53	4
12603	234111	5365-01-101-1634	50	1
			51	1
			52	1
			53	1

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
12603	234113		50	7
			51	7
			52	7
			53	7
12603	234130		48	42
12603	234141	5365-01-099-3936	48	6
			48	9
12603	234145	5365-01-099-8161	48	24
12603	234157	2520-01-162-4402	49	42
12603	234166	5330-01-038-4713	55	26
12603	234169	4820-01-106-9806	55	15
12603	234170		55	17
			55	23
12603	234181	5360-01-099-3934	55	13
12603	234185		55	12
12603	234207		46	37
12603	234210	5340-01-104-7832	46	26
12603	234215	3110-01-099-7303	46	34
12603	234216	5365-01-100-9348	46	33
12603	234226		46	28
12603	234228	3110-01-101-4748	47	16
12603	234229	5365-01-099-8148	47	12
12603	234230	5365-01-099-0113	47	15
			48	44
12603	234237		46	36
12603	234248	3040-01-102-5745	47	17
12603	234256	3020-01-099-1755	47	26
12603	234257	5315-01-105-7362	47	23
12603	234264	3110-00-483-2254	47	25
12603	234265	3120-01-119-0510	47	27
12603	234279	5330-01-110-7939	56	9
12603	234286	5365-01-109-4253	46	45
12603	234299		47	22
12603	234304	5365-01-099-0114	48	7
12603	234305	5365-01-099-8162	48	27
12603	234309	5315-01-099-0065	47	24
12603	234327	2520-01-101-0937	46	3
			46	11
12603	234336	3010-01-103-7440	50	3
12603	234347	5365-01-099-8149	48	18
			48	31
			48	43
12603	234350	5365-01-105-2983	48	16
			48	32
			48	63
12603	234362	2815-01-104-0709	46	50
12603	234427	2520-01-109-7958	55	3
12603	234650		55	16
12603	234665		56	7
12603	234668		56	3
12603	234902		48	86

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
12603	234904	5365-01-101-3821	48	83
12603	234906	5307-01-112-4450	48	96
12603	234908	5365-01-104-5252	46	6
			46	10
			46	14
			46	16
			46	21
12603	234918	5340-01-104-7831	47	21
12603	234932	5307-01-099-9073	47	5
12603	234954	3020-01-103-3403	48	20
12603	234973		46	24
12603	234999	5310-01-121-5538	48	22
12603	235214		46	25
12603	235216		46	32
12603	235283	5330-01-040-4785	54	7
12603	235296	2920-01-103-6389	47	9
12603	235297		46	22
12603	235315		55	10
12603	235327	2520-01-109-7959	55	4
12603	235473	5360-01-099-1419	55	25
12603	235591	5310-01-099-4980	46	35
12603	235593		46	49
12603	235749		48	48
12603	235763	3110-01-099-7500	48	51
12603	235764	5365-01-101-8255	48	49
12603	235959	5340-01-099-1427	48	15
			48	33
			48	62
12603	235960	5360-01-099-0101	48	14
			48	34
			48	61
12603	236140	3020-01-103-4264	47	19
12603	236150	2520-01-101-2927	50	5
12603	236151	3020-01-099-1756	48	8
12603	236165	3010-01-103-7439	48	19
12603	236178	2520-01-100-4584	52	5
			53	10
12603	236283		48	95
12603	236472		56	2
12603	236582	3020-01-099-1102	46	23
12603	236583	3020-01-099-2725	46	18
12603	236584	3020-01-099-6126	46	15
12603	236585	3020-01-103-0199	46	7
12603	236607	3010-01-124-7903	48	37
12603	236611	2520-01-162-4405	52	8
12603	236612	2520-01-121-6377	48	56
12603	236613	3010-01-105-0393	48	65
12603	236614	5365-01-101-4920	48	60
12603	236622	3130-01-170-6086	48	66
12603	236623		49	33
12603	236624		49	38

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
12603	236625	5365-01-101-1633	48	67
12603	236629		48	100
12603	236637		49	27
12603	236646		49	4
12603	236656		50	8
12603	236681	3020-01-103-3315	48	28
12603	236737		55	14
12603	236847	2520-01-099-3931	50	2
			51	2
			52	2
			53	2
12603	236992	3040-01-107-5673	48	72
12603	237016	3010-01-104-0361	51	3
			52	3
			53	3
			53	9
12603	237032		50	6
			51	6
			52	6
			53	6
12603	237035		68	15
12603	237104	3020-01-103-6117	48	112
12603	237111	2520-01-106-6811	48	103
12603	237112		48	108
12603	237113		48	99
12603	237114		48	107
12603	237115	5315-01-112-8112	48	104
12603	237116		48	110
12603	237117	3110-01-109-6090	48	109
			48	111
12603	237118	3120-01-109-7563	48	102
			48	113
12603	237141		46	44
12603	237142		46	43
12603	237271	3110-01-105-7310	48	101
12603	237377		47	7
12603	237378		47	8
12603	237381		49	6
12603	237437		47	3
12603	237442	5365-01-118-2857	48	13
			48	54
12603	237443	5310-01-104-5936	48	12
			48	53
12603	237450		51	5
			53	5
12603	237453	2520-01-162-5171	53	8
12603	237454	4320-01-100-0162	54	6
12603	237507	2520-01-162-4404	51	8
12603	237573		49	11
12603	237669	5365-01-105-2982	48	11
			48	52

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
12603	237860		49	37
12603	237890		49	31
12603	237936		46	29
12603	238085		56	1
12603	238900	5307-01-106-5317	47	4
99103	23916-20		76	5
99103	23916-4-2	4730-01-102-6544	18	1
12603	239218	5330-01-018-5359	48	79
24161	24VW		76	4
74400	24107	6210-01-117-1929	34	18
27007	24500-126C		75	7
27007	24500-142		75	5
27007	24500-510C		75	32
27007	24500-600		75	21
27007	24500-612		75	17
27007	24500-63S		75	6
27007	24500-636	5330-01-077-5242	75	20
27007	24500-643		75	10
27007	24500-653		75	18
27007	24500-930		75	
27007	24500524	3040-01-195-9187	75	31
27007	24501-250		75	11
27007	24501-251		75	15
			75	27
27007	24501-301	3020-01-107-6918	75	24
27007	24501-314		75	16
27007	24501-315	3020-01-107-5374	75	13
57733	24956	6645-01-083-4759	34	30
12603	25K-30012		48	39
12603	25K-30018		49	29
12603	25K-30022		48	97
			55	6
12603	25K-40026		49	2
			49	24
			49	28
12603	25K-40104		49	26
			49	34
12603	25K-40328		48	98
12603	25K-40508		48	85
12603	25K-60116		48	94
			48	117
10988	26-882	5305-00-425-1983	2	26
74400	26418	6220-01-102-2794	39	1
02249	2684-001		85	15
02249	2706-001	5330-01-102-0343	85	14
02249	2707-001		87	5
			88	5
		5330-01-102-0342	88	13
			88	22
16764	274738		33	49
16764	274875	5305-00-422-4221	33	55

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
78500	2758R18	5360-00-733-9948	69	8
74687	277-A-80	5340-01-100-2474	82	45
02249	2781-001		87	11
			88	11
92865	28-030-002	2530-01-107-2218	71	31
10988	28-10120	5306-01-104-4825	63	51
			65	51
76359	2835CD	2540-01-082-3968	83	7
78500	2858M91	5360-00-217-9600	69	7
12603	286223	2520-01-105-7088	45	3
11862	2962793	5910-01-035-7415	44	18
77060	2965142	5940-00-788-1586	43	4
			44	10
77060	2965164		44	9
77060	2965467		43	7
			44	11
77060	2965867		34	11
			34	14
			34	17
			34	20
96279	297060R1		48	41
77060	2971962		43	19
77060	2973392		34	10
			34	13
			34	16
			34	19
			43	20
77060	2984017	5935-01-156-7020	43	6
77060	2984323	6250-01-146-6909	43	16
24617	2984528		34	8
92865	30-010-302		71	3
92865	30-010-304		71	4
92865	30-020-107		71	11
92865	30-030-153		71	19
92865	30-100-292		71	29
92865	30-100-336		71	16
19220	300R	2590-01-102-5806	81	19
13445	30063-STK		34	37
13445	30063-6	5925-01-170-5762	34	26
			34	42
13445	30103-25	5925-01-102-3630	32	10
95879	301370	4730-00-591-3405	63	42
			65	42
30327	303E	4820-00-845-1096	26	16
77326	31-183	2920-01-107-2326	34	24
77326	31-243-B	2920-01-145-0351	34	24
70485	316	5325-00-291-0812	38	12
92865	32-330-007		71	17
92865	32-390-011		71	24
92865	32-390-012		71	23
92865	32-390-013		71	22

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
92865	32-570-005	2530-00-283-3321	71	10
92865	32-630-108		71	20
92865	32-630-235		71	8
92865	32-640-050		71	13
92865	32-640-052		71	18
92865	32-660-164		71	15
92865	32-660-204		71	21
92865	32-830-124		71	26
78500	3200S1111		64	5
			66	5
78500	3202-P-7868	2520-01-206-8580	63	32
			65	32
78500	3202-Q-7869	2520-01-206-0921	63	12
			65	12
10988	321-4404		2	6
10988	321-5268		7	21
78500	3212Q355		64	6
			66	6
78500	3226E655		64	40
			66	40
78500	3235W413		64	19
			66	19
78500	3235Z884		64	20
			66	20
02249	3265-001		87	22
			88	34
78500	3278Z104	2520-00-891-5995	64	25
			66	25
78500	3280S7533	9905-01-092-1918	63	8
			65	8
92865	33-115-017	5330-00-172-7263	71	30
92865	33-200-001		71	27
17875	331	2640-00-242-7619	73	1
78500	333H268		63	20
			65	20
02249	3411-001		87	4
			88	4
			88	23
29510	346729R91	4730-00-891-0665	17	12
72512	35D	5355-00-893-5247	57	1
			57	6
			89	1
10988	353-405		82	35
04808	360A632PC1		2	7
78500	36169		64	46
			66	46
78500	3719W23		63	17
			65	17
78500	372-D-290		68	3
78500	3897X1896		64	36
			66	36

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
78500	3905L90	2815-01-213-1041	63	37
			65	37
78500	3920	3110-00-100-0380	63	36
			65	36
78500	3984	3110-00-100-3095	63	22
			65	22
78500	3994	3110-00-100-3096	64	10
			66	10
12603	40K-02	4730-00-105-2684	55	20
77640	400075	3120-00-929-8162	74	54
77640	400100	3120-01-101-1425	74	56
77640	401081	5360-00-253-7229	74	95
77640	401082	5360-00-253-7230	74	96
77640	401233	5365-00-806-4105	74	43
77640	401358	5360-01-109-1631	74	27
77640	401360		74	33
77640	401360-A1-538		74	32
04994	401362	5365-01-100-5099	74	36
			74	86
04994	401366	5310-01-103-8628	74	57
77640	401367	5365-01-099-8880	74	53
76359	402CD	5310-00-212-0120	83	9
77640	402235-A1	4320-00-922-4933	74	63
77640	402803		74	5
77640	402803-A1		74	4
10988	41-1052	5340-01-087-0680	2	8
79550	411724	5961-00-492-7871	30	10
			34	21
			43	8
			44	13
77640	415395		74	40
77640	415395-A1		74	38
77640	415395-A2		74	37
77640	415554-A1	5365-01-103-1609	74	17
08244	41740		20	16
78500	43226E655		64	39
78500	436169		64	45
			66	45
78500	44143	3110-00-100-3600	64	43
			66	43
78500	44348	3110-00-100-0586	64	41
			66	41
19207	444687	4730-00-018-9566	47	29
			47	30
			49	9
77640	450029	2590-00-371-3137	74	93
77640	451987		74	81
78500	453X	3110-00-142-4387	63	26
			65	26
16764	453435	5310-00-476-7648	33	20
16764	453464	5305-01-017-1574	33	14

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
77640	454895		74	99
16764	455106		33	27
24455	4578	6240-00-643-0687	36	3
78500	462	3110-01-008-0222	63	21
			65	21
77640	465379	2590-00-525-4387	74	91
12603	47K-7		56	5
77640	475109		74	74
77640	475109-A1		74	71
77640	477235		74	16
77640	477248-209		74	62
77640	477254		74	58
72850	480572	2910-01-102-4251	18	10
10988	49832	5340-00-414-8593	72	19
10988	49838	5340-00-404-4169	63	45
			65	45
10988	49851	5340-00-414-9846	72	16
10988	49854		43	33
			57	47
10988	49855	5340-01-105-2271	43	27
10988	49858	5340-00-404-4101	44	29
10988	49859	5340-00-425-6432	24	23
			44	30
10988	49885	5340-00-518-1440	24	25
40152	5C-516	5305-00-007-6061	46	38
12603	5C612	5305-00-576-0795	46	46
12603	5E-09	5310-01-019-2583	68	14
02249	5032-6561-001		87	25
			88	37
02249	5042-6139-007		87	12
			88	24
02249	5072-6089-001		86	7
02249	5072-6140-001		87	2
			88	2
02249	5072-6140-003		87	3
			88	3
02249	5072-6140-006		88	15
02249	5072-6762-001		86	1
02249	5072-6879-001		85	13
02249	5072-7054-001		88	12
02249	5092-6755-001	5330-01-103-8771	87	20
			88	32
79136	5100-62	5365-00-298-6563	89	2
02249	5102-6821-004		85	5
79396	51452	2940-00-350-9325	12	2
79136	5160-118	5365-00-107-9068	91	47
79136	5160-125	5365-00-420-3857	46	31
			46	39
79136	5160-137MF		91	42
02249	5172-6140-003		88	17
19207	5294507	5310-00-350-2655	37	13

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
77060	5297062	5999-01-119-4109	43	17
08108	53	6240-00-013-1282	34	5
19207	5325350	5310-00-194-0607	17	13
			17	46
51002	55-292-00		74	101
51002	55-294-00		74	102A
79136	5500-100	5365-00-420-3860	77	22
79136	5500-150	5365-00-420-3858	90	28
92865	56-001-008		BULK	3
70040	5651834		21	
19207	5705387	2815-01-182-7424	12	
19207	591304	5305-00-291-8685	24	4
80813	597	5355-01-103-3258	81	24
12603	6H-24	5340-01-110-1818	49	14
12603	60K-30018	5330-01-101-4773	54	8
12603	60K-30114		46	40
89881	60K-40104	5330-01-181-2430	55	11
10988	61-616	5305-01-071-8139	91	22
70960	62NLS28-1	2520-00-118-1436	62	13
70960	62NLS32-9	2520-01-008-6138	61	20
70960	62NYSM28-9	3010-01-107-2154	62	11
70960	62NYSM32-31	3010-01-101-1623	61	19
70960	62NYS28-129	2520-01-013-9393	61	1
70960	62N1A		60	5
			61	12
			62	4
70960	62N4-4A		60	4
			61	10
			62	3
70040	6402719	5930-01-007-6490	40	10
70040	6402722	5930-01-113-5919	40	1
70040	6426395	6680-01-104-0899	40	7
70040	6432376	6680-01-106-0039	34	3
70040	6460032	5930-00-220-6716	40	14
70040	6460392	5930-01-067-7382	40	13
70040	6464917	6620-01-108-9250	34	4
71772	65-C-1604	2815-00-223-4927	7	12
88690	65-2570-1	2920-01-106-9580	34	28
02249	6530-001		86	4
02249	6552-001		87	26
			88	38
12603	664131	2530-00-195-0154	48	55
15953	670074-9	5940-00-283-5280	34	36
			34	41
81321	6711418		22	9
81321	6711419		22	5
78189	6718-61-07	5310-00-100-6811	11	2
89749	672572	2990-01-106-9245	48	47
02249	6752-001	5330-00-000-0085	87	21
			88	33
02249	6754-001		88	16

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
02249	6760-001		86	2
02249	6770-011		85	12
74687	68D842	2090-00-869-7142	82	47
73342	6842326-115	5315-00-829-8334	23	4
12603	710047	3110-00-554-3184	46	5
			46	19
91561	7312-009	2520-01-106-8281	97	10
19207	7320641	5305-00-737-5694	38	3
19207	7320642	5340-00-732-0642	37	9
			38	4
19207	7320658	5330-00-297-7106	38	7
19207	7320711	5340-00-693-4175	37	6
19207	7350906	4730-00-248-6728	12	
19207	7402408	5305-00-105-1207	33	53
51002	7404900		74	102
			74	102A
02249	7433-001		87	19
			88	31
12603	743458	3110-00-554-5304	46	13
02249	75-410		88	39
83259	7500-3-8	5330-00-874-3744	13	14
02249	7507-004		95	8
02249	7510-001	4820-01-104-0949	95	7
99984	7525	5315-00-407-6494	81	1
19207	7525938	5305-00-752-5938	37	10
19207	7525940	6220-00-695-1107	37	8
19207	7526018	6220-00-752-6018	38	2
30327	770FB1/8IN	4730-00-131-1423	19	18
02249	7700-001		87	23
			88	35
16764	800612	2920-01-103-8952	30	15
16744	800832		31	27
12603	801192		68	4
12603	801214		68	7
			68	7
12603	801715		68	2
16764	801826		31	14
16764	801890	2920-01-102-4998	33	1
12603	801979	5330-01-104-4563	54	
12603	801981	5330-01-104-4564	55	
02249	8072-006		87	1
			88	1
02249	8084-001		87	24
16764	809593		33	67
92867	81-000108	5340-01-070-4475	67	8
02249	8100-004		85	6
92687	81000-131		67	9
92687	81000-343		67	7
13445	81264	2530-01-061-1351	34	67
10988	814-8025	5306-01-101-9416	30	5
55683	818-A151281	4330-00-373-1564	22	

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
16764	821453		33	32
10988	825-1106	5310-01-102-2398	31	1
19207	8338566	5935-00-572-9180	37	5
19207	8338567	5310-00-833-8567	37	4
02249	8366-001		88	36
19207	8378662		38	6
02249	8398-008		86	6
94222	85-15-300-16		42	13
94222	85-34-101-20	5310-00-822-8525	42	11
94222	85-47-101-15	5325-00-998-3351	42	10
18876	8527012	5310-00-582-5765	17	3
13445	8629	5930-00-503-4884	70	30
19207	8741442	5325-00-088-6147	37	2
19207	8741492	5935-00-807-4109	37	1
19207	8747986		37	3
19207	8747987		37	7
13445	88564	5310-01-129-9829	34	70
10988	892-1108	5310-01-102-0332	30	4
78500	9X16	5305-01-083-9357	63	7
			64	3
			65	7
			66	3
13445	90036	5930-00-004-3904	34	44
12603	91F-7		56	6
76197	9112001		70	19
10988	92-5	5310-01-066-9287	94	37
10988	92-6	5310-01-069-4887	91	94
89345	9409949	4730-00-010-3875	64	52
			65	13
			66	52
16764	9427815	5306-00-407-3737	33	21
			33	62
80813	95	5355-00-893-5247	58	3
10988	95-6	5310-00-031-1879	91	93
24617	954295	3110-00-554-5972	48	46
78500	965-64-42736	2520-00-601-2722	60	
70960	965-65-42736		60	11
70960	965-92-39087	3010-01-103-7441	62	

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable consumable maintenance supplies you will need to operate and maintain the Forklift Truck MHE 237. These items are authorized to you by CTA 50–970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS

a. Column 1–Item Number. This number is asigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 11, App. D").

b. Column 2–Level. This column identifies the lowest level of maintenance that requires the listed item.

C–Operator/Crew
O–Organizational Maintenance
F–Direct Support Maintenance
H–General Support Maintenance

c. Column 3–National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4–Description. Indicates the Federal item name, and if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National stock number	(4) Description	(5) U/M
			GAA. GREASE. AUTOMOTIVE AND ARTILLERY MIL-G-10924 (81349)	
1	O	9150-00-065-0029	2-1/4 OZ TUBE	EA
2	O	9150-00-935-1017	14 OZ CARTRIDGE	EA
3	O	9150-00-190-0904	1 LB CAN	EA
4	O	9150-00-190-0905	5 LB CAN	EA
5	O	9510-00-190-0907	35 LB PAIL	EA
			OIL. LUBRICATING. ENGINE MIL-L-2104 (81349)	
6	O	9150-00-186-6689	1 QT CAN	EA
			OIL. HYPOID. SAE 90 MIL-L-2104 (81349)	
7	O	9150-01-035-5393	5 GAL CAN	EA
			CLEANING EQUIPMENT	
8	O	7920-00-291-5815	BRUSH. WIRE: Scratch. S-wire, Curved hdl, wire lg outside block: 1 1/8 to 1 1/4 in. 4 rows wide, 18 rows lg. 14 in lg	
9	O	7920-00-205-1711	RAGS. COTTON: Wiping	BL
10	O	6850-00-264-9038	SOLVENT: Dry Cleaning. Fed Spec PD-680. 1 Gal Can	EA
			MAINTENANCE SUPPLIES	
			ADHESIVE, Rubber Base General Purpose MIL-A-5092B Type 1	
11	O	8040-00-262-9025	4 OZ TUBE	EA
12	O	8040-00-262-9028	1 PT CAN	EA
13	O	8040-00-262-9031	1 QT CAN	EA
14	O	8020-00-559-0389	BRUSH. PAINT: 2 in. wide	EA
15	O	5350-00-221-0872	CLOTH. ABRASIVE: Crocus. ferric oxide and quartx. jean-cloth-backing. exposed coat. 9 x 11 sh, 50-sh sheave (81348) P-C-458A. 42-C-20420-50	
			CLOTH, ABRASIVE: Al-oxide, jean-cloth-backing. closed coat. 9 x 11 sh. 50–sh sheave P-C-451A, Type a, Class 1	
16	F	5350-00-192-5047	GRIT NO. 80 (GR 1/0)	EA
17	F	5350-00-192-5049	GRIT NO. 120 (GR 3/0)	EA
18	F	5350-00-192-5051	GRIT NO. 180 (GR 5/0)	EA
19	H	8030-00-833-9116	COMPOUND. SEALING: Grade AV (Red) MIL-S-22473 6 oz. tube	EA
20	H	8030-01-014-5869	THREAD SEALANT: MIL-STD-46163 (81349) 50 cc Bottle	EA
21	F	8030-00-873-4792	PERMATEX 2 (79225) 1 QT CONTAINER	EA
22	F	6850-00-598-7328	CLEANING COMPOUND MIL-C-10597 (81349)	EA
23	0	9150-01-102-9455	Brake Fluid, Silicone, Automotive, MIL-B-46176, plastic container	1 gallon

APPENDIX E
TORQUE LIMITS

E-1. GENERAL

This section provides general torque limits for fasteners. Special torque values are indicated in the maintenance procedures for applicable components. The general torque values given in this appendix shall be used when specific torque values are not indicated in the maintenance procedures.

E-2. TORQUE LIMITS

Torque limits are listed in table E-1 for dry fasteners and in table E-2 for wet fasteners. Dry fasteners are defined as fasteners on which no lubricants are applied to the threads; wet fasteners are defined as fasteners on which special graphited or moly-disulphide greases or other extreme pressure lubricants are applied to the threads.

Table E-1. Torque Limits for Dry Fasteners

SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLIMETERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	5-6	6.8- 8.13	9-11	12.2- 14.9	12-15	16.3- 20.3
5/16	7.94	10-12	13.6- 16.3	17-20.5	23.1- 27.8	24-29	32.5- 39.3
3/8	9.53	20- 23	27.1- 31.2	35-42	47.5- 57.0	45- 54	61.0- 73.2
7/16	11.11	30- 35	40.7- 47.4	54-64	73.2- 86.8	70-84	94.9- 113.9
1/2	12.70	45- 52	61.0- 70.5	80-96	108.5- 130.2	110-132	149.2- 179.0
9/16	14.29	65- 75	88.1-101.6	110-132	149.2- 179.0	160-192	217.0- 260.4
5/8	15.88	95-105	128.7-142.3	150- 180	203.4- 244.1	220- 264	298.3- 358.0
3/4	19.05	150-185	203.3-250.7	270- 324	366.1- 439.3	380- 456	515.3- 518.3
7/8	22.23	160-200	216.8-271.0	400- 480	542.4- 650.9	600- 720	813.6- 976.3
1	25.40	250-300	338.8-406.5	580- 696	786.5- 943.8	900-1080	1220.4-1464.5
1-1/8	25.58	-	-	800- 880	1084.8-1193.3	1280-1440	1735.7-1952.8
1-1/4	31.75	-	-	1120-1240	1518.7-1681.4	1820-2000	2467.9-2712.0
1-3/8	34.93	-	-	1460-1680	1979.8-2278.1	2380-2720	3227.3-3688.3
1-1/2	38.10	-	-	1940-2200	2630.6-2983.2	3160-3560	4285.0-4827.4

Table E-2. Torque Limits for Wet Fasteners

SIZE		TORQUE					
		SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 8	
INCHES	MILLIMETERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS	POUNDS FOOT	NEWTON METERS
1/4	6.35	4.5- 5.5	6.1- 7.5	8 - 10	10.8- 13.6	11 - 13.5	14.9- 18.3
5/16	7.94	9 - 11	12.2- 14.9	15 - 18.5	20.4- 25.1	21.5- 26	29.2- 35.3
3/8	9.53	18 - 20.5	24.4- 27.8	31.5- 38	42.8- 51.6	40.5- 48.5	55 - 65.9
7/16	11.11	27 - 31.5	36.7- 42.8	48.5- 57.5	65.9- 78.2	63 - 75.5	85.6- 102.6
1/2	12.70	40.5- 47	55 - 63.9	72 - 86.5	97.9- 117.6	99 - 119	134.6- 161.8
9/16	14.29	58.5- 67.5	79.5- 91.8	99 - 119.0	134.6- 161.8	144 - 173	195.8- 235.2
5/8	15.88	85.5- 94.5	116.2-128.5	135 - 162	183.6- 220.3	198 - 237.5	269.2- 323
3/4	19.05	135 -166.5	183.6-226.4	243 - 291.5	330.4- 396.4	342 - 410	465.1- 557.6
7/8	22.23	144 -180	195.8-224.8	360 - 432	489.6- 587.5	540 - 648	734.4- 881.2
1	25.40	225 -270	306 -367.2	522 -626	709.9- 851.3	810 - 972	1101.6-1321.9
1-1/8	25.58	-	-	720 - 792	979.2-1077.1	1152 -1296	1566.7-1762.5
1-1/4	31.75	-	-	1008 -1116	1370.8-1517.7	1638 -1800	2227.6-2448
1-3/8	34.93	-	-	1314 -1512	1787 -2056.3	2142 -2448	2430.3-3329.2
1-1/2	38.10	-	-	1746 -1980	2374.5-2692.8	2844 -3204	3867.8-4357.4

APPENDIX F

ELECTRICAL AND HYDRAULIC DIAGRAMS

Section I. INTRODUCTION

F-1. GENERAL

This appendix contains an electrical diagram and an hydraulic diagram. Also included in this appendix is a description of how to use the electrical diagram as an aid to troubleshooting (section II). Section III contains the diagrams (figures F-3 through F-5).

F-2. DIAGRAMS

The hydraulic diagram is located in figures F-3 and F-4 and the electrical diagram is located in figure F-5. Figure F-3 shows the hydraulic oil flow when the various controls are in the neutral position. Figure F-4 shows the hydraulic oil flow when the controls are activated.

Section II. HOW TO USE ELECTRICAL SCHEMATIC AS AN AID TO TROUBLESHOOTING

F-3. OVERVIEW

a. Figure F-5, your Electrical Diagram, is designed to help you understand the electrical circuits associated with this vehicle. It is generally referred to as a "schematic" and uses "symbols" to represent real components. It is not drawn to scale (as in a blueprint) nor does the location of the symbols represent actual location of components in the vehicle. It is a simple "picture" of how the circuits and components are connected together.

b. To quickly find a malfunction or trouble in the electrical system and repair it requires an understanding of how the system operates and a method for checking it out. "Troubleshooting" provides the "method" for check out procedures and your technical manual (Troubleshooting tables and schematics) provides the "operating principles".

F-4. TROUBLESHOOTING

Troubleshooting is the systematic (step-by-step) isolation of a malfunction or trouble to the faulty component, harness connector/wire. It is a guide that helps develop a routine or "way" of finding troubles in any electrical system or circuit. As you become more familiar with this vehicle and gain experience, you will find ways to shorten these procedures and decrease down time. BEFORE you attempt to make any repairs or checks, do the following:

a. Find out how the system works under normal conditions and how to operate it.

b. Make sure the malfunction or trouble reported to you "really" exists. ("Dead batteries" could end up as a "failure to start" because of a faulty neutral start switch or the transmission shift lever not fully engaged in park or neutral.) Try to duplicate the trouble so you can be sure you're on the right track.

c. Check troubleshooting index for most likely cause, then identify the circuit that is malfunctioning.

d. Study the electrical schematic to learn which components, harnesses, or wires could contribute to or cause the malfunction.

NOTE

Remember, when tracing circuits on the electrical schematic, that you should always start at the positive (+) side of the battery. Current will flow outward from that point through the circuits and return to the negative (–) side of the battery by way of ground wires and the vehicle frame.

e. Make necessary tests and checks to isolate circuit or component as outlined in the troubleshooting section of this technical manual.

f. Make repairs, if you're sure. If not, continue to isolate the malfunction, or ask for help from your foreman or supervisor.

g. After repairs, make sure everything has been re-connected and tightened.

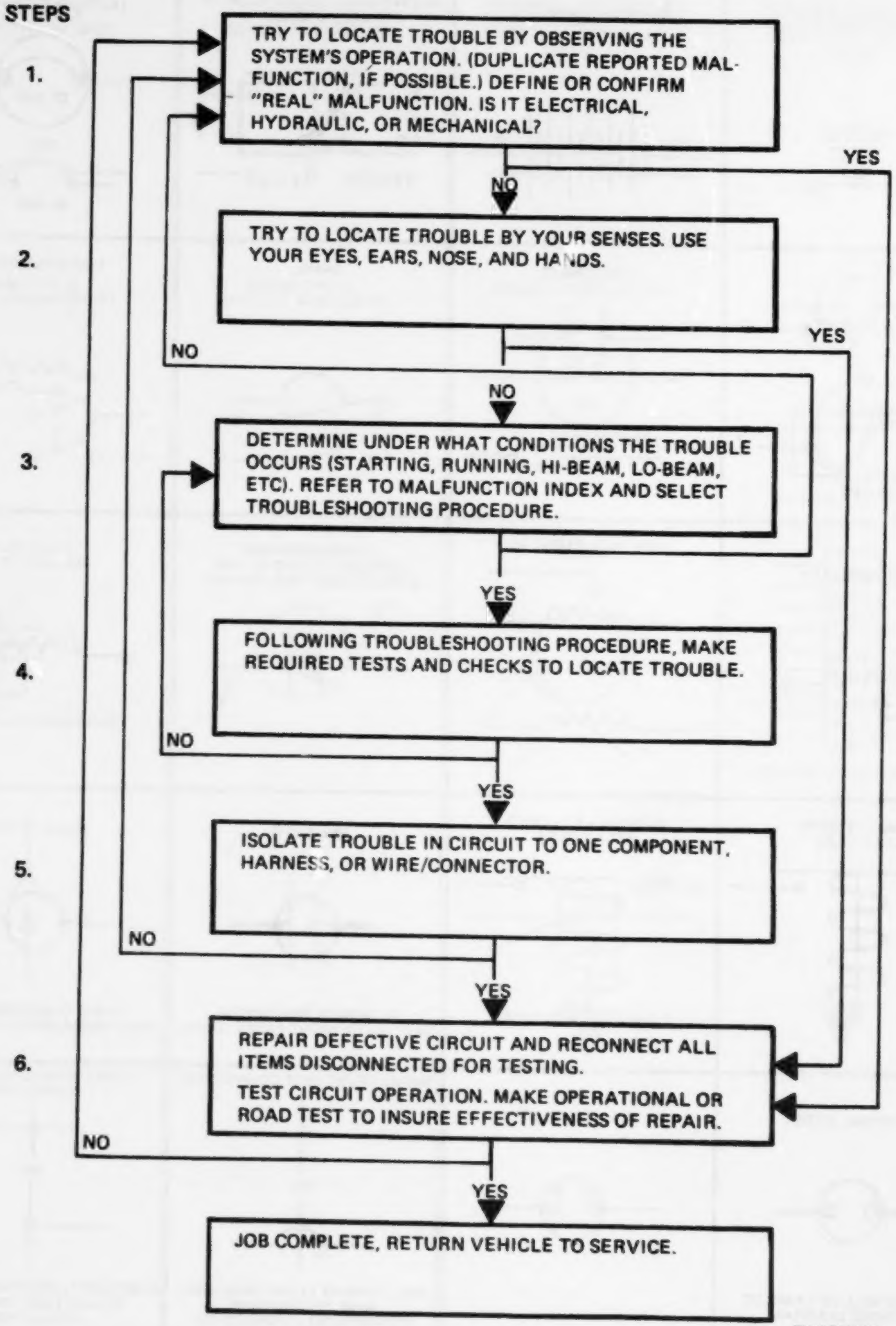
h. Make operational checks to verify that the system/circuit is functioning properly again.

F-5. TROUBLESHOOTING LOGIC TREE

Figure F-1 is a Troubleshooting logic tree. It is designed to help you develop a quick logical way of approaching an electrical troubleshooting problem.

F-6. ELECTRICAL SYMBOLS

Figure F-2 shows you the basic electrical symbols used with most schematics. They will help you read and understand the electrical circuits.



1. TRY TO LOCATE TROUBLE BY OBSERVING THE SYSTEM'S OPERATION. (DUPLICATE REPORTED MALFUNCTION, IF POSSIBLE.) DEFINE OR CONFIRM "REAL" MALFUNCTION. IS IT ELECTRICAL, HYDRAULIC, OR MECHANICAL?

2. TRY TO LOCATE TROUBLE BY YOUR SENSES. USE YOUR EYES, EARS, NOSE, AND HANDS.

3. DETERMINE UNDER WHAT CONDITIONS THE TROUBLE OCCURS (STARTING, RUNNING, HI-BEAM, LO-BEAM, ETC). REFER TO MALFUNCTION INDEX AND SELECT TROUBLESHOOTING PROCEDURE.

4. FOLLOWING TROUBLESHOOTING PROCEDURE, MAKE REQUIRED TESTS AND CHECKS TO LOCATE TROUBLE.

5. ISOLATE TROUBLE IN CIRCUIT TO ONE COMPONENT, HARNESS, OR WIRE/CONNECTOR.

6. REPAIR DEFECTIVE CIRCUIT AND RECONNECT ALL ITEMS DISCONNECTED FOR TESTING.
TEST CIRCUIT OPERATION. MAKE OPERATIONAL OR ROAD TEST TO INSURE EFFECTIVENESS OF REPAIR.

JOB COMPLETE, RETURN VEHICLE TO SERVICE.

Figure F-1. Logic Tree Troubleshooting Technique.

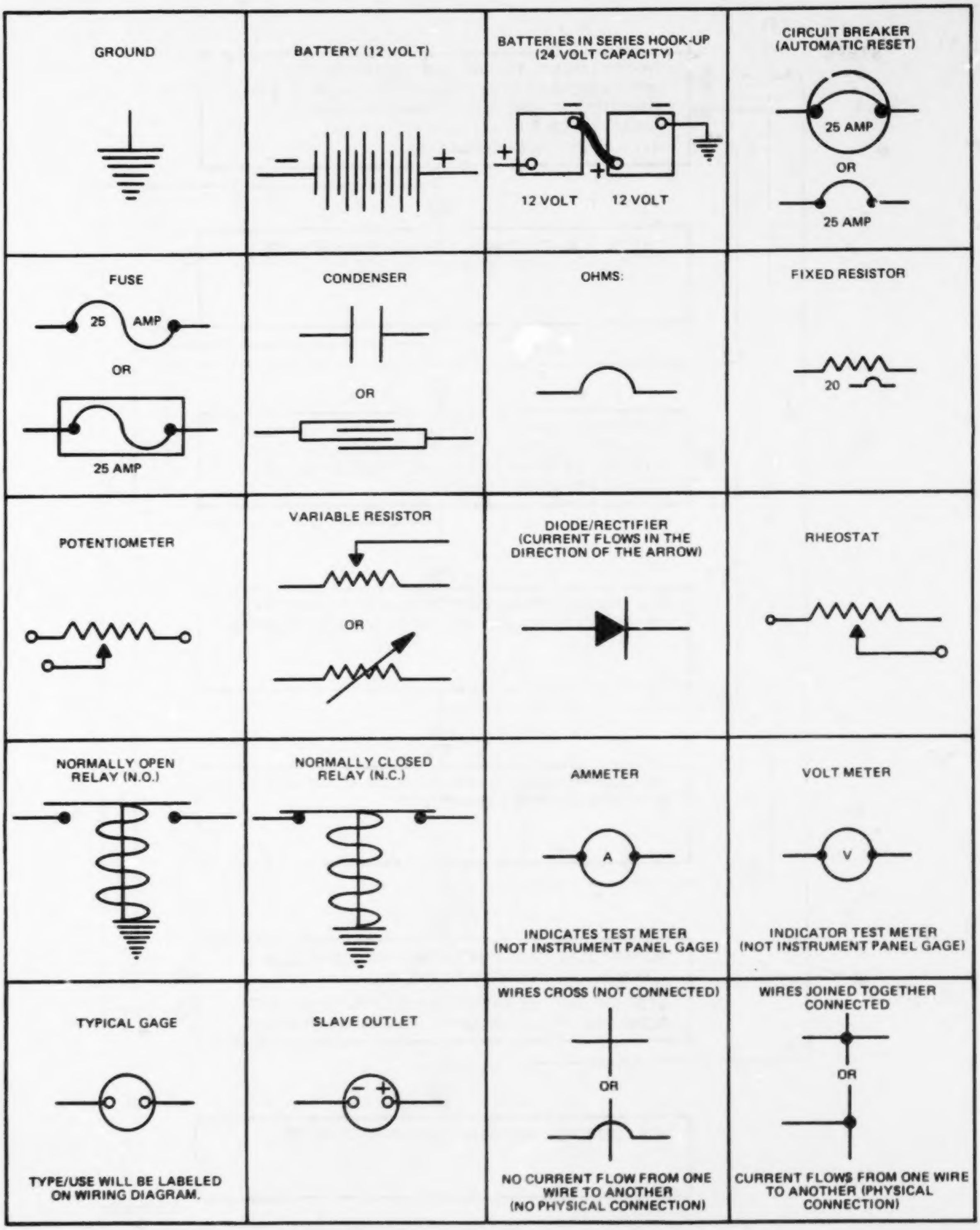
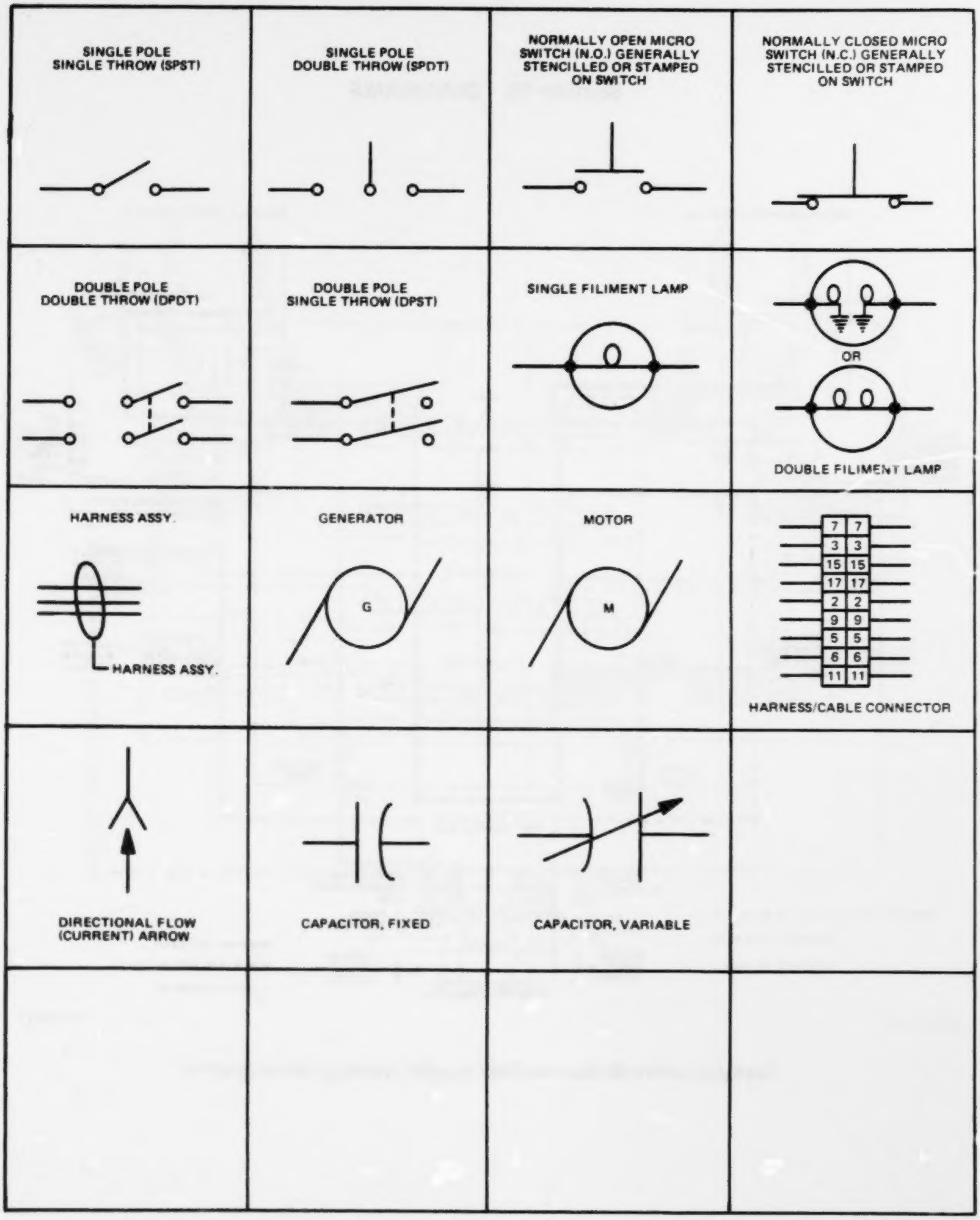

GROUND
BATTERY (12 VOLT)
−
+
BATTERIES IN SERIES HOOK-UP (24 VOLT CAPACITY)
+
−
+
−
12 VOLT
12 VOLT
CIRCUIT BREAKER (AUTOMATIC RESET)
25 AMP
OR
25 AMP
FUSE
25
AMP
OR
25 AMP
CONDENSER
OR
OHMS:
FIXED RESISTOR
20
POTENTIOMETER
VARIABLE RESISTOR
OR
DIODE/RECTIFIER (CURRENT FLOWS IN THE DIRECTION OF THE ARROW)
RHEOSTAT
NORMALLY OPEN RELAY (N.O.)
NORMALLY CLOSED RELAY (N.C.)
AMMETER
A
INDICATES TEST METER (NOT INSTRUMENT PANEL GAGE)
VOLT METER
V
INDICATOR TEST METER (NOT INSTRUMENT PANEL GAGE)
TYPICAL GAGE
TYPE/USE WILL BE LABELED ON WIRING DIAGRAM.
SLAVE OUTLET
−
+
WIRES CROSS (NOT CONNECTED)
OR
NO CURRENT FLOW FROM ONE WIRE TO ANOTHER (NO PHYSICAL CONNECTION)
WIRES JOINED TOGETHER CONNECTED
OR
CURRENT FLOWS FROM ONE WIRE TO ANOTHER (PHYSICAL CONNECTION)
TA127510.1

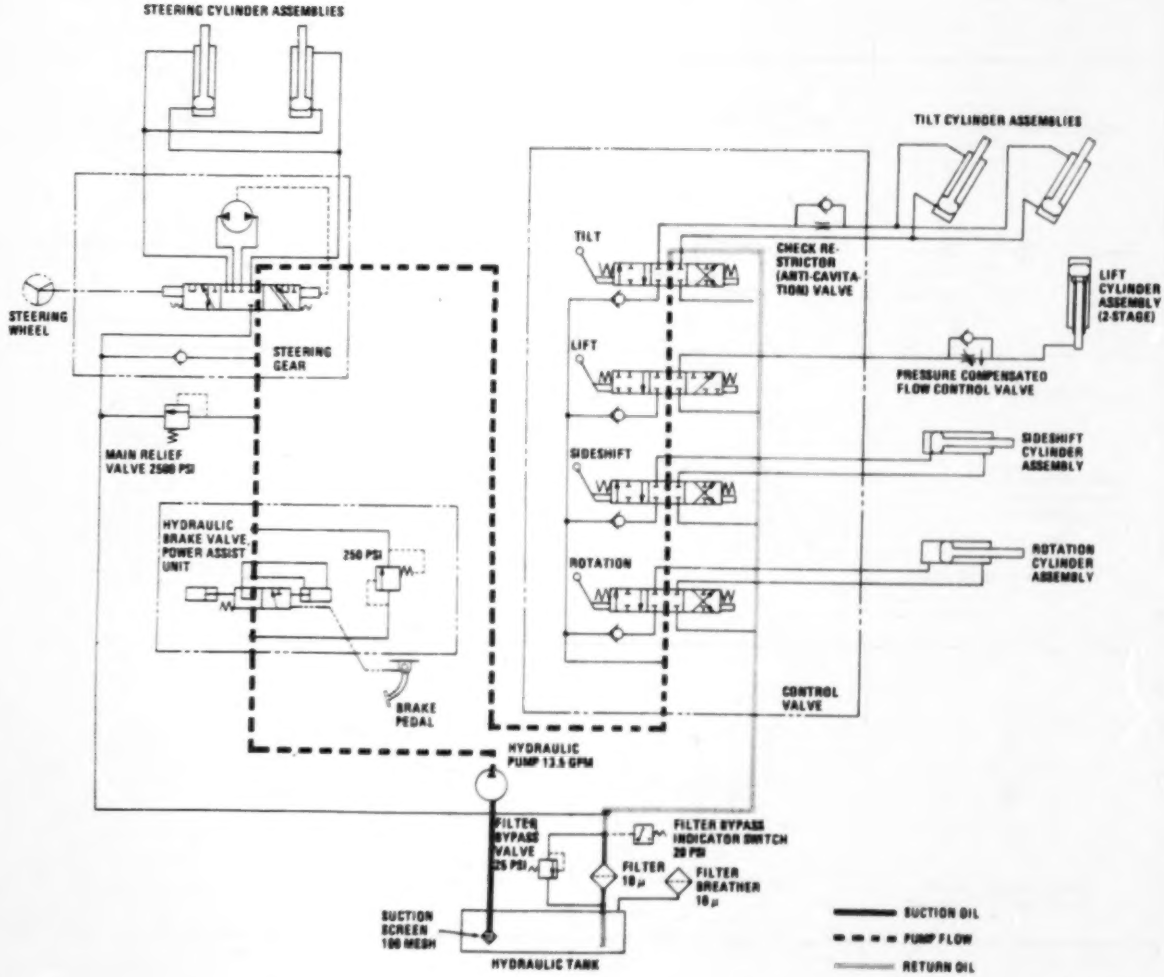
Figure F-2. Electrical Symbols (Sheet 1 of 2).


SINGLE POLE SINGLE THROW (SPST)
SINGLE POLE DOUBLE THROW (SPDT)
NORMALLY OPEN MICRO SWITCH (N.O.) GENERALLY STENCILLED OR STAMPED ON SWITCH
NORMALLY CLOSED MICRO SWITCH (N.C.) GENERALLY STENCILLED OR STAMPED ON SWITCH
DOUBLE POLE DOUBLE THROW (DPDT)
DOUBLE POLE SINGLE THROW (DPST)
SINGLE FILIMENT LAMP
OR
DOUBLE FILIMENT LAMP
HARNESS ASSY.
HARNESS ASSY.
GENERATOR
G
MOTOR
M
7 7
3 3
15 15
17 17
2 2
9 9
5 5
6 6
11 11
HARNESS/CABLE CONNECTOR
DIRECTIONAL FLOW (CURRENT) ARROW
CAPACITOR, FIXED
CAPACITOR, VARIABLE

TA127510.2

Figure F-2. Electrical Symbols (Sheet 2 of 2).

Section III. DIAGRAMS


STEERING CYLINDER ASSEMBLIES
STEERING WHEEL
STEERING GEAR
MAIN RELIEF VALVE 2500 PSI
HYDRAULIC BRAKE VALVE, POWER ASSIST UNIT
250 PSI
BRAKE PEDAL
HYDRAULIC PUMP 13.5 GPM
FILTER BYPASS VALVE 25 PSI
SUCTION SCREEN 100 MESH
HYDRAULIC TANK
FILTER BYPASS INDICATOR SWITCH 20 PSI
FILTER 10 µ
FILTER BREATHER 10 µ
TILT CYLINDER ASSEMBLIES
TILT
CHECK RESTRICTOR (ANTI-CAVITATION) VALVE
LIFT
LIFT CYLINDER ASSEMBLY (2-STAGE)
PRESSURE COMPENSATED FLOW CONTROL VALVE
SIDESHIFT
SIDESHIFT CYLINDER ASSEMBLY
ROTATION
ROTATION CYLINDER ASSEMBLY
CONTROL VALVE
SUCTION OIL
PUMP FLOW
RETURN OIL

TA127512

Figure F-3. Hydraulic Diagram (Oil Flow with Controls in Neutral Position).

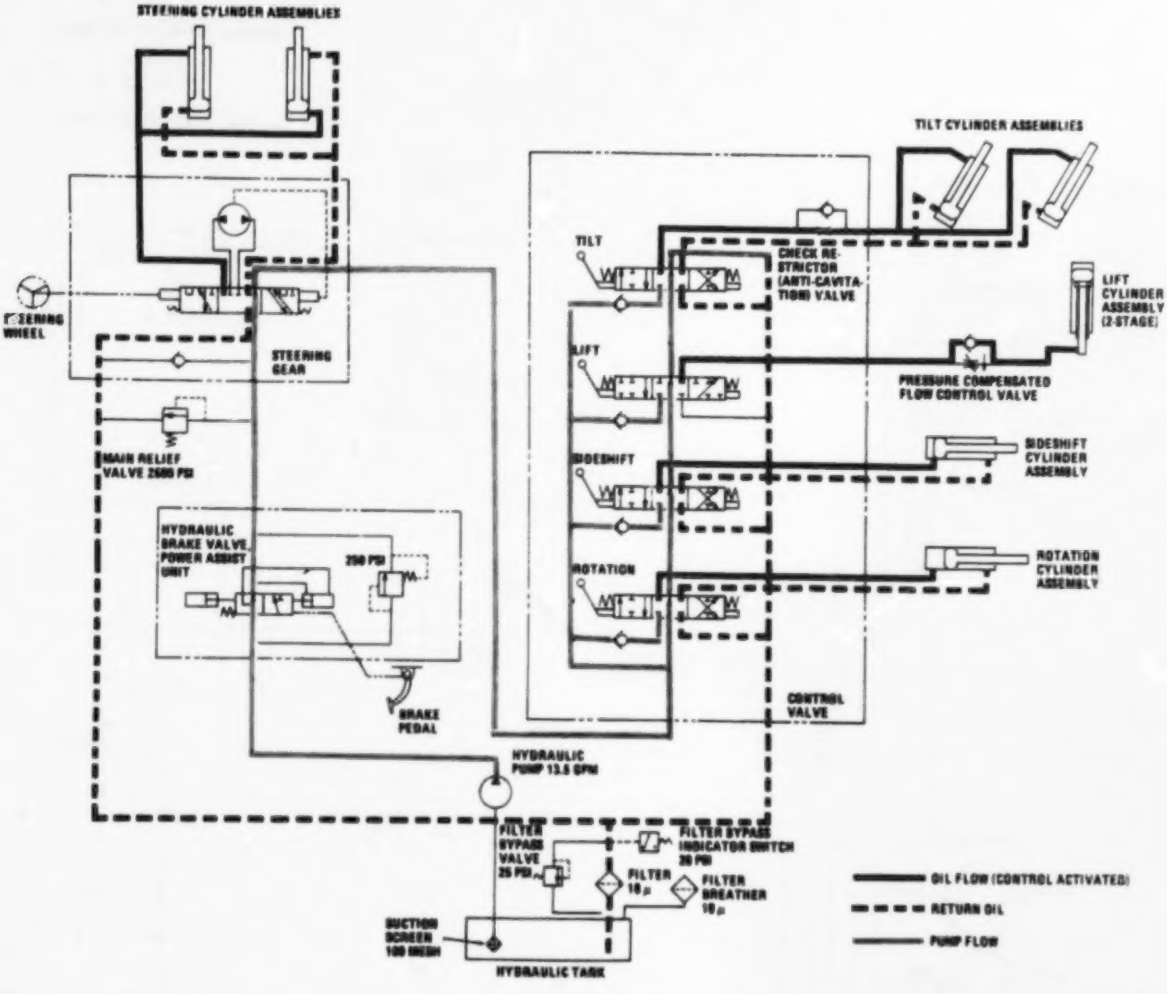

STEERING CYLINDER ASSEMBLIES
STEERING WHEEL
STEERING GEAR
MAIN RELIEF VALVE 2600 PSI
HYDRAULIC BRAKE VALVE POWER ASSIST UNIT
250 PSI
BRAKE PEDAL
HYDRAULIC PUMP 13.5 GPM
FILTER BYPASS VALVE 25 PSI
FILTER BYPASS INDICATOR SWITCH 20 PSI
FILTER 10 µ
FILTER BREATHER 10 µ
SUCTION SCREEN 100 MESH
HYDRAULIC TANK
TILT CYLINDER ASSEMBLIES
TILT
CHECK RESTRICTOR (ANTI-CAVITATION) VALVE
LIFT
LIFT CYLINDER ASSEMBLY (2-STAGE)
PRESSURE COMPENSATED FLOW CONTROL VALVE
SIDESHIFT
SIDESHIFT CYLINDER ASSEMBLY
ROTATION
ROTATION CYLINDER ASSEMBLY
CONTROL VALVE
OIL FLOW (CONTROL ACTIVATED)
RETURN OIL
PUMP FLOW
TA127513

Figure F-4. Hydraulic Diagram (Oil Flow with Controls Activated).

Chart Transposed to
End of Volume.

APPENDIX G
GLOSSARY

ABBREVIATIONS

A	Annually
AMDF	Army Master Data File
AMP	Ampere
AR	Army regulation
ASSY	Assembly
ATTN	Attention
B	Biennially
BAT	Battery
BHP	Brake horsepower
BLK	Black
BLU	Blue
B.O.	Blackout
BOI	Basis of issue
BRN	Brown
BRT.	Bright
BTDC	Before top dead center
CONT	Continued
CC	Cubic centimeter
CCW	Counterclockwise
CW	Clockwise
DA	Department of the Army
dB (A)	Decibel
D.C.	District of Columbia
DD	Department of Defense
DED	Diesel engine driven
DK	Dark
DMWR	Depot maintenance work requirements
DSL INJ	Diesel fuel injector
E	Empty
EA	Each
EQUIP	Equipment
F	Fahrenheit
FED SPEC	Federal Specification
FM	Field Manual
FSCM	Federal Supply Code for Manufacturers
FWD	Forward
GAA	Grease, Automotive and Artillery
GAL	Gallon
GEN PURP	General purpose
GPM	Gallons per minute
GRA	Gray
GRD	Ground
H	Hours
I.D.	Inside diameter
IGN	Ignition
K	Thousand
LB	Pound
LG	Long
LIN	Line item number

ABBREVIATIONS (cont)

LO	Lubrication order
LT	Light
LIN	Line item number
M	Motor
MAC	Maintenance Allocation Chart
MAX	Maximum
MECH	Mechanic
MHE	Material Handling Equipment
MI	Miles
MIN	Minimum
MM	Millimeter
MPH	Miles per hour
MTOE	Modified table of organization and equipment
MWO	Modification work order
N	Neutral
NC	National coarse thread
NEG	Negative
NF	National fine thread
No.	Number
NSN	National stock number
O.D.	Outside diameter
ORG	Organizational
OZ	Ounce
PARA	Paragraph
PMCS	Preventive maintenance checks and services
P/N	Part Number
POS	Positive
PRESS	Pressure
PSI	Pounds per square inch
PT	Pint
Q	Quarterly
QT	Quart
QTY	Quantity
R	Reverse
ROPS	Roll over protective structure
RPM	Revolutions per minute
RPSTL	Repair parts and special tools list
S	Semiannually
SAE	Society of Automotive Engineers
SB	Service bulletin
SER.	Service
SMR	Source, Maintenance, and Recoverability Codes
SYS	Systems
TAMMS	The Army Maintenance Management System
TARCOM	U.S. Army Tank–Automotive Material Readiness Command
TB	Technical Bulletin
TDC	Top dead center
TM	Technical Manual
TMDE	Special Test, Measurement, and Diagnostic Equipment
U/M	Unit of measure
UNC	Unified National coarse thread
UNF	Unified National fine thread
V	Volt

ABBREVIATIONS (cont)

Vdc	Volt (direct-current)
VIO	Violet
WD	Wide
WHT	White
WSDC	Weapons System Designator
YEL	Yellow

APPENDIX H

ILLUSTRATED LIST OF MANUFACTURED ITEMS

H-1. INTRODUCTION

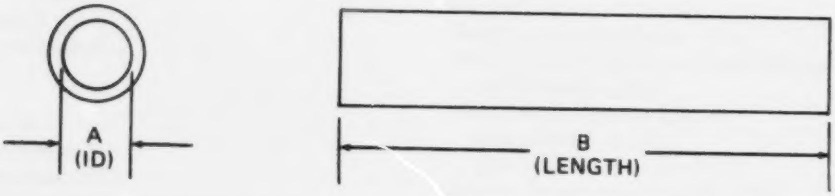
This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational maintenance. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria. All bulk materials needed for manufacture of an item are listed by NSN in a tabular list on the illustration.

H-2. MANUFACTURED ITEMS PART NUMBER INDEX

PART NUMBER	FIGURE
D64267	H-1
L102543	H-1
L102913	H-1
L60451	H-1
L60515	H-1
L78902	H-1
L79326	H-1

H-3. MANUFACTURED ITEMS ILLUSTRATIONS

Figure H-1, a simplified line drawing, illustrates all items authorized to be manufactured/fabricated by organizational maintenance personnel. Included thereon are all dimensions and information necessary for the manufacture. The Part Number column of the table lists the part numbers of the items to be manufactured, and the Description column describes the items. The Dimension and Materials columns provide information on the size of each item and the material from which it shall be manufactured.



TA127505

Part Number	Description	Dimension (Inches)		NSN
		A	B	
D64267	Hose, Filter Supply	1/4	31 (±0.2)	4720-00-007-9424
D64267	Hose, Return	1/4	31 (±0.2)	4720-00-007-9424
L102543	Hose, Fuel	1/4	10 (±0.2)	4720-00-374-8125
L102913	Hose, Suction	1-1/4	23	
L60451	Hose, Vent	1/4	27	4720-00-460-2477
L60515	Hose, Vent	1/4	32	4720-00-460-2477
L78902	Hose, Breather	3/4	44 (±0.5)	
L79326	Hose, Fuel Filter	1/4	81343	4720-00-374-8125

Figure H-1. Manufactured Items

ALPHABETICAL INDEX

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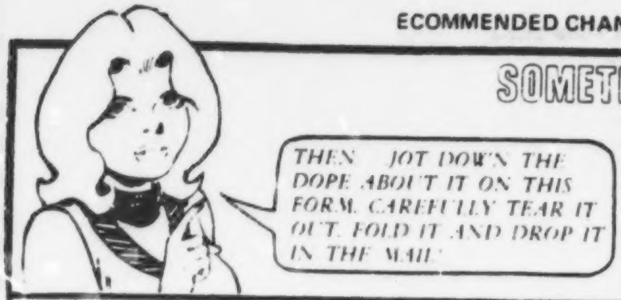
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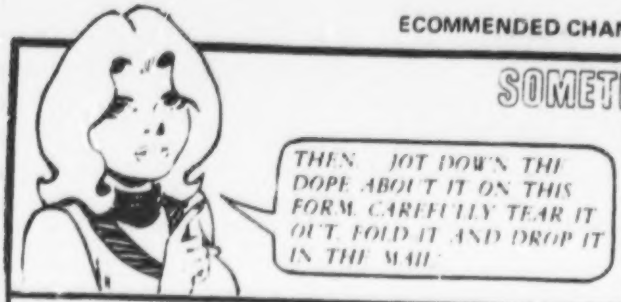
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TEAR ALONG PERFORATED LINE

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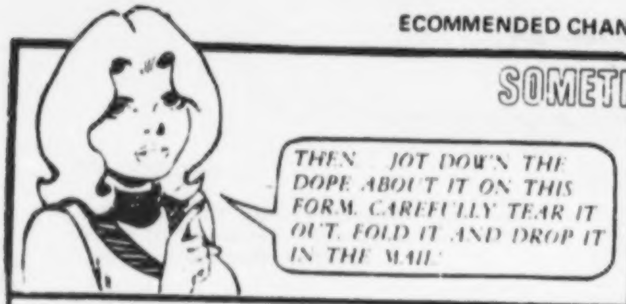
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TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9 (^{0}F – 32) = ^{0}C
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
9/5 C^0 + 32 = F^0

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

CM.
INCHES
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
1
2
3
4
5
6

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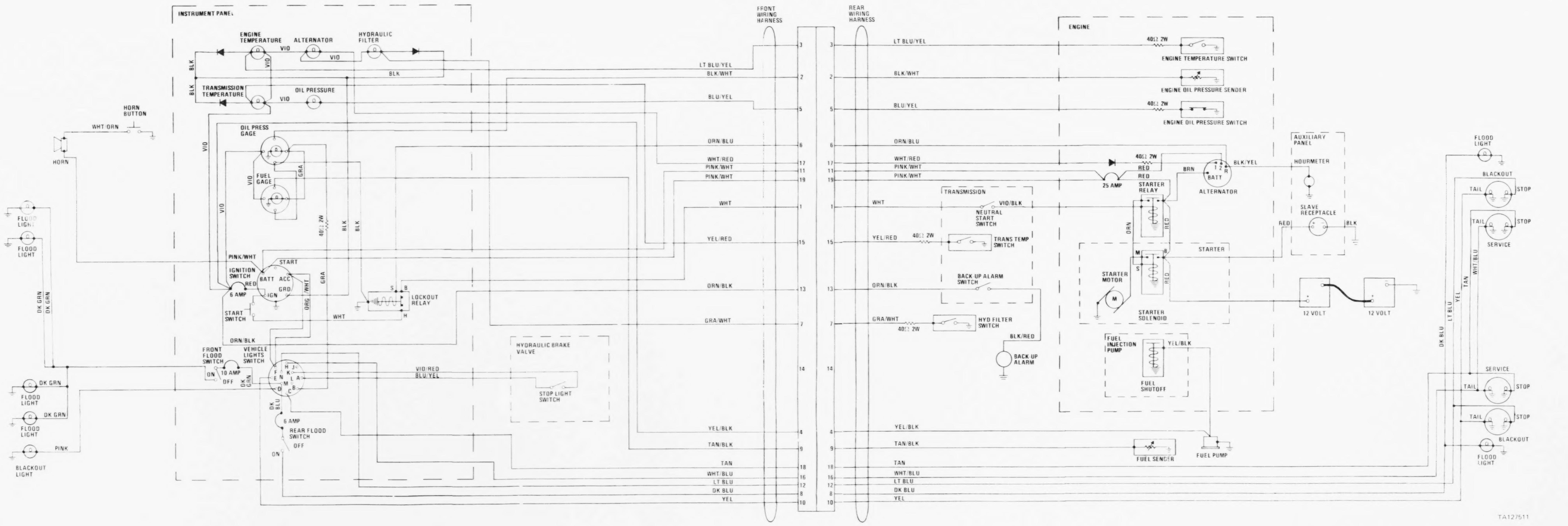
INSTRUMENT PANEL
ENGINE TEMPERATURE
ALTERNATOR
HYDRAULIC FILTER
VIO
BLK
TRANSMISSION TEMPERATURE
OIL PRESSURE
HORN BUTTON
WHT/ORN
HORN
OIL PRESS GAGE
FUEL GAGE
GRA
FLOOD LIGHT
FLOOD LIGHT
40Ω 2W
PINK/WHT
START
IGNITION SWITCH
BATT
ACC
RED
GRD
6 AMP
IGN
WHT
ORG
START SWITCH
LOCKOUT RELAY
S
B
H
DK GRN
ORN/BLK
FRONT FLOOD SWITCH
VEHICLE LIGHTS SWITCH
ON
10 AMP
OFF
H J K L A F E N M D C B
VIO/RED
BLU/YEL
FLOOD LIGHT
DK GRN
FLOOD LIGHT
DK GRN
BLACKOUT LIGHT
PINK
DK BLU
6 AMP
REAR FLOOD SWITCH
OFF
ON
HYDRAULIC BRAKE VALVE
STOP LIGHT SWITCH
FRONT WIRING HARNESS
REAR WIRING HARNESS
LT BLU/YEL 3
BLK/WHT 2
BLU/YEL 5
ORN/BLU 6
WHT/RED 17
PINK/WHT 11
PINK/WHT 19
WHT 1
YEL/RED 15
ORN/BLK 13
GRA/WHT 7
14
YEL/BLK 4
TAN/BLK 9
TAN 18
WHT/BLU 16
LT BLU 12
DK BLU 8
YEL 10
ENGINE
40Ω 2W
ENGINE TEMPERATURE SWITCH
ENGINE OIL PRESSURE SENDER
40Ω 2W
ENGINE OIL PRESSURE SWITCH
40Ω 2W
RED
RED
25 AMP
BRN
1 2 R
BATT
ALTERNATOR
BLK/YEL
STARTER RELAY
TRANSMISSION
VIO/BLK
NEUTRAL START SWITCH
40Ω 2W
TRANS TEMP SWITCH
BACK-UP ALARM SWITCH
HYD FILTER SWITCH
40Ω 2W
BLK/RED
BACK-UP ALARM
ORN
RED
M
B
S
STARTER
STARTER MOTOR
M
STARTER SOLENOID
FUEL INJECTION PUMP
YEL/BLK
FUEL SHUTOFF
FUEL SENDER
FUEL PUMP
AUXILIARY PANEL
HOURMETER
SLAVE RECEPTACLE
RED
BLK
12 VOLT
12 VOLT
FLOOD LIGHT
BLACKOUT
TAIL
STOP
TAIL
STOP
SERVICE
DK BLU
LT BLU
YEL
TAN
WHT/BLU
SERVICE
TAIL
STOP
TAIL
STOP
BLACKOUT
FLOOD LIGHT

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Figure F-5. Electrical Diagram.

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